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1 The Need and Demand for Orthodontic Treatment of Schoolchildren in Surabaya, Indonesia. T AGUSNI*, D SINDHUSAKE and P D BARNARD (Public Health Dentistry, University of Sydney, Australia).

Demand and need for orthodontic treatment were studied in a sample of 2750 12 year old schoolchildren in Surabaya. The data were collected by using questionnaire and interview with the Index of Orthodontic Treatment Need used to evaluate treatment needs. Using the Dental Health Component, 32% of the subjects were classified as Grade 1-2 with no need for treatment, 45% borderline as Grade 3, and the remaining 23% in Grade 4-5 i.e. definite need for treatment. The Aesthetic Component assessment indicated that 45% fell into Grade 1-4 with no need for treatment, 38% were borderline, and 17% were in great need for treatment. The most prevalent type of malocclusion showed in the anterior segment as crowding (42%) and protrusion (30%). Responses to the questionnaire revealed that children most disliked the appearance of the shape of their teeth (25%), protrusion (19%), tooth colour (18%) and size (11%) followed by crooked teeth (9%). These reasons made them feel the need to have orthodontic treatment for their better appearance. Self-assessment was more favourable as the children assessed their need higher than assessment by the dentist. There was no significant difference between gender in relation to the need of orthodontic treatment or their self-assessment. Indeed, the prevalence of malocclusion among the schoolchildren in Surabaya is high and it is likely that they have great motivation for having orthodontic treatment.

2 Changes in Class III children treated by maxillary protraction headgear. S. CHAROENPONE* (Chulalongkorn Univ., Bangkok, Thailand).

The purpose of the current report was to investigate possible orthopaedic effects of maxillary protraction headgear (MPH) on dentofacial morphology in skeletal Class III females before and during the pubertal growth spurt. Sixty-one patients were divided into three groups, the pre-pubertal (n=20), the mid-pubertal (n=22) and the late-pubertal (n=19) groups. The mean ages at completion of the MPH treatment were 8.9, 11.3 and 13.3 years for the three test groups. The average treatment time was 1.1, 1.0 and 1.4 years for each of these groups. Lateral cephalograms at the start and completion of use of the MPH were collected. Annual differences were calculated from these paired records for each of 21 dentoskeletal variables in the test groups and compared to those of the control group. The pre- and the mid-pubertal groups revealed significant increases in both the SNA ($p<0.01$ and $p<0.001$) and the maxillary length (Ptm-A/PP, $p<0.01$), while the late-pubertal group showed a less significant increase in the SNA ($p<0.05$) alone. The decreased SNB, increased ANB and SNMP of the pre- and mid-pubertal groups was accounted for by the backward and downward rotation of the mandible. The results suggest possible orthopaedic effects of the MPH on dentofacial morphology in young females when it is applied before or during acceleration of the pubertal growth spurt.

3 Biomechanics of Mandibular Molar Uprighting. S. VITEORN* and W. MATHURASAI (Dept. of Orthodontics, Fac. of Dentistry, Chulalongkorn Univ., Thailand).

Uprighting of a mandibular molar that has tipped mesially is the most challenging treatment in conjunction with periodontal and restorative therapy. The basic problems of molar movement are its greatest mass as well as the position that is influenced by various forces. The objective of the presentation is to evaluate the segmental biomechanics of molar uprighting with T loop spring, helical spring and root spring.

The result indicated that the three springs produced different stress distributions as revealed in the photoelastic model. The T loop spring produced distal crown tipping and mesial root movement with extrusion of the uprighting molar. The helical spring produced mainly distal crown tipping with extrusion of the molar. Whereas the root spring produced mainly mesial root movement. The aforementioned springs also produced undesirable effect on the anchorage unit.

4 Computed Cephalometry - how reliable is it? KF Lim* and KWC Foong (Government Dental Clinic, National University of Singapore)

Computed radiography can produce diagnostic image at reduced radiation. To assess the reliability of landmark identification on lateral cephalogram, 40 computed images, taken at 30% reduced radiation (70kV, 15mA, 0.35s) were compared to 40 conventional images (70kV, 15mA, 0.5s). The 80 images were taken from 40 orthodontic patients at post-treatment and 1 year after retention. The order and type of imaging was randomised. 5 orthodontists identified 5 skeletal and 5 soft tissue landmarks on each of the 80 films. The error of identification was analysed in the XY cartesian coordinate following digitisation. One way ANOVA shows that there is generally no significant difference between the 2 imaging systems in both coordinates ($p > 0.05$). Moreover, the difference is generally small ($< 1\text{mm}$), and is unlikely to be of clinical significance. Based on the findings of the current study, computed lateral cephalogram can be taken with a reduction of 30% off recommended radiation exposure.

5 Epidemiology of malocclusion in a sample of 12-13 year-old Malaysian schoolchildren. R. Bea*, IA Razak and TN Md-Dom (Dental Faculty, University Malaya, 50603 Kuala Lumpur, Malaysia).

An epidemiological investigation involving 1519 schoolchildren aged 12-13 years was undertaken to assess malocclusion traits and the need for orthodontic treatment using WHO-ICS II basic method for recording occlusal traits. The sample comprised of schoolchildren attending 20 secondary government and government-aided schools in urban and rural areas of Klang District. There were 772 boys and 747 girls. The sampling procedure involved a multistage, clustered and stratified random sampling. Crowding was prevalent in 50.3% of the subjects with anterior crowding significantly higher in the urban than the rural population ($p<0.05$). Indian children were found to have a significantly higher anterior spacing as compared to Chinese and Malays ($p<0.01$). However no significant differences were found between ethnicity and in the number of missing teeth and midline diastema. A higher percentage of boys (47.7%) had increased maxillary overjet than girls ($p<0.01$). Crossbite and openbite were not common occlusal features. Of the children examined 77% had no need of orthodontic treatment. These findings will be useful for the public dental services to plan orthodontic services in view of increasing public demand.

This study was supported by the University of Malaya, Grant PJP 226/90.

6 Treatment of Crowding Teeth With Interproximal Reduction of The Teeth. Nazruddin*, (Department of Orthodontics Faculty of Dentistry University of North Sumatera.)

The most common type of malocclusion is crowding. Patients with crowding teeth usually are referred to the orthodontist by the patient's parent because of obvious dental irregularities or lack of sufficient space for tooth eruption. They usually present with a class I molar relationship or a tendency toward either class II or class III malocclusion. To eliminate discrepancies between aggregate tooth size and existing basal arch length is through the use of interproximal reduction. This technique involves the removal of enamel interproximally, especially in areas in which there are rounded tooth contacts. Interproximal enamel reduction to resolve crowding is usually limited to the mandibular incisors and involves the removal 2 - 4 mm of proximal enamel. In contrast, this technique not only used to the mandibular incisors, in which comprehensive interdental stripping involves a sequence procedures designed to precisely remove interdental enamel. This technique used a high-speed air-turbine hand-piece quickly and painlessly reduces the proximal surfaces and contours the enamel walls to resemble their original morphology. After use this technique in a few patients I have concluded that interproximal reduction technique indicates that consistently resolves moderate crowding of 4 - 8 mm and is a valuable treatment option in borderline extraction cases.

7

Variations in germ-tube formation amongst oral *Candida albicans* isolates from HIV-infected and uninfected individuals.
NAIR RG*, SAMARANAYAKE LP (Oral Biology Unit, Faculty of Dentistry, The University of Hong Kong, Hong Kong).

There is no data on germ-tube (GT) formation in *C. albicans* isolates associated with HIV-infection. Hence a total of 47 oral *C. albicans* isolates (29 from HIV-infected and 18 from uninfected individuals) was investigated using a previously described method using bovine serum and TC 199 medium as GT inducers. Briefly, 0.5 ml of *C. albicans* suspension (10^7 cells/ml) was incubated at 37°C for 90 min with an equal volume of bovine serum. One hundred *Candida* cells were counted for GT formation using a haemocytometer, under 400x magnification. In addition, a select group of 6 isolates both from HIV-infected and uninfected individuals were pre-exposed to apo-lactoferrin (20 µg/ml) and lysozyme (20 and 50 µg/ml) followed by serum to evaluate their effect on GT induction. Amongst the media tested, serum produced more GT compared with TC 199 medium (mean 25.2 ± 35.7% and 23.0 ± 26.2%, respectively), irrespective of the source of *C. albicans*. When the GT forming ability of *C. albicans* isolates from HIV-infected and uninfected individuals was compared, a marginally high rate was observed amongst the former group ($p > 0.05$). Whereas apo-lactoferrin (20 µg/ml) and lysozyme (20 µg/ml) had no effect, lysozyme at a concentration of 50 µg/ml suppressed the *C. albicans* GT formation. The foregoing indicates that serum is a better GT inducer compared with TC 199 medium, and isolates from HIV-infected individuals and those uninfected have no significant difference in GT forming ability.

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Minimum Inhibitory Concentration (MIC) of Antibacterial Agents Against Cariogenic Organisms
MG Botelho* & LP Samaranyake. Prince Phillip Dental Hospital, Hong Kong

While some research has investigated the MIC of antibacterial agents against bacteria associated with plaque, there has been little on the MICs of bacteria specifically isolated from carious lesions. A total of thirty one bacteria: streptococci (9), lactobacilli (10) and actinomyces (12); isolated from carious lesions were tested as to their minimum inhibitory concentration (MIC) against eight antibacterial mouthwash agents. The antibacterial agents were: chlorhexidine diacetate, chlorhexidine dihydrochloride, chlorhexidine gluconate, benzalkonium chloride, cetrimide, cetylpyridinium chloride, thymol and sodium hypochlorite. Using an accepted protocol, serial dilutions of the antibacterial agents were prepared in microtitre plates in concentrations from 64 µg/ml to 0.0625 µg/ml. An inoculum of the test organism equivalent to 10×10^5 colony forming units per millilitre was dispensed into a microwell containing thioglycolate media and antibacterial agent. The tray was then incubated for 48 hours at 35°C. After this time, the lowest concentration at which no growth occurred was recorded to be the MIC. Thymol and sodium hypochlorite did not show any antibacterial activity at the concentrations tested. The MIC range for all the microorganisms was 8.0 to 0.125 µg/ml. There was no statistically significant difference between the MICs of the three chlorhexidines and the remaining 3 antibacterial agents. The results from this study indicate that while thymol and sodium hypochlorite have limited antimicrobial effect antibacterial agents commonly used in mouthwashes have similar MIC levels against cariogenic bacteria.

9

Subgingival microflora and periodontal conditions in outpatients at Chulalongkorn University. H.NAPAWONGDEE J.KUWATANASUCHATI and R.MAHANONDA* (Faculty of Dentistry, Chulalongkorn University, Thailand).

The aims of the present study were to evaluate the periodontal conditions using the CPITN and the new loss of attachment index of WHO and also to investigate the presence of *Porphyromonas gingivalis* in subgingival plaque of the outpatients at the Faculty of Dentistry, Chulalongkorn University. 288 patients were examined. By using the CPITN only, it was found that more than 55% of the patients under the age of 25 had gingivitis and the minority had periodontitis. In contrast, more than 60% of the older age group (>25 year old) had periodontitis. The use of the two indices together show that most of the younger age group with 4-5 mm probing depth did not have attachment loss. On the other hands, the patients above the age of 35 generally showed the measurement of attachment loss greater than probing depth. That might imply that the use of the CPITN in the younger age group seems to overestimate the prevalence and severity of periodontal destruction and vice versa in the older age group.

Thirty samples of subgingival plaque were taken from either upper first or second molars (one sample per one patient). Fifteen samples were from the periodontitis sites (CPITN=4), while the rest were from the healthy sites (CPITN=0). *P. gingivalis* was identified by culturing technique, Gram stain smear and the illumination test under UV light (365nm). *P. gingivalis* was detected in 86.67% of the sites with advanced periodontitis, while none was found in the healthy sites. The proportion of this organism to anaerobic bacteria in the diseased group ranged 0.16-18.67% with median of 4.22%, hence supporting the role of *P. gingivalis* in advanced periodontitis in the Thai population.

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Bacterial morphotype of supragingival plaque in Chinese subjects.
K.Y. ZEE*, L.P. SAMARANAYAKE (Department of Periodontology & Public Health and Oral Biology Unit, Faculty of Dentistry, The University of Hong Kong)

The aim of this study was to estimate the percentage distribution of different bacterial morphotypes of supragingival plaque in Chinese subjects by using the experimental gingivitis model. Seven healthy dental students were recruited from Prince Phillip Dental Hospital. All the subjects were provided with once-a-week professional prophylaxis for 3 weeks in order to ensure gingival health. In the fourth week, after prophylaxis, the subjects began a 21-day period without any mechanical or chemical plaque control. Plaque along the buccal gingival margin of 16, 15, 14, 24, 25, 26 were removed on Day 1, 3, 5, 7, 14, 21 respectively with a sterile curette and dispersed onto a drop of distilled water placed on a microscopic slide. Gram stained smears were prepared for light microscopy. At 1000X magnification, the single cell seen was classified as Gram-positive or Gram-negative cocci, rod, filament, fusiform organism, spirilla and spirochaeta. A differential count of 200 organisms from 3-6 fields in the microscope were performed. The figure obtained for each group of microorganisms were then expressed as percentage of the total number of bacteria counted. Gingival crevicular fluid (GCF) flow were measured from 13-23 during the 21 days by using Periotron® machine. A total of 42 smears were obtained and examined. Results showed GCF flow increased during the 21-day period. Gm+ve microorganisms were the predominant type of bacteria throughout the 21 days (66-93%) while Gm+ve bacteria only constituted around (5-22%). The proportion of the shaped bacteria increased with the plaque age. This is in contrast to results from studies using the same methodology in Caucasian populations in which Gm+ve bacteria were the predominant organisms. Further studies in the Chinese population are needed to confirm or refute these findings.

11

THE POTENTIAL EFFECT OF CATECHIN IN TEA LEAF ON STREPTOCOCCUS MUTANS
R. R. OWEN* (PEDODONTIC DEPT. FACULTY OF DENTISTRY PADJADJARAN UNIVERSITY, BANDUNG-INDONESIA)

The objective of the study was to determine the minimal concentration (MIC) of catechin in tea that could inhibit the growth of *Streptococcus mutans*. This bacteria is predominant in caries formation. Based on the MIC it could be decided a used dilution concentration (UDC) of catechin in tea.

The sample was scraping of caries lesion taken from children who visited Pedodontic Clinic - The Faculty of Dentistry Padjadjaran University. The extraction of catechin from green tea was done in The Tea Research Center Laboratory in Gembung-Indonesia.

A serial dilution method of NCCLS (1985) was used to determine the minimal inhibitory concentration of catechin to *Streptococcus mutans*.

The microscopic examination and the identification of the cultures indicated that *Streptococcus mutans* is detected predominantly in caries. The serial dilution test showed that the minimal inhibitory concentration (MIC) of catechin was 0.5 mg/ml.

The statistical analysis using Two Ways Analysis of Variance followed by Multiple Comparison showed that the number of *Streptococcus mutans* decreased significantly in 0.5 mg concentration of catechin with the optimal contact time of 3 to 5 minute. It is assumed that to be used as a mouth gargle a used dilution concentration (UDC) of catechin in tea is 2 mg/ml (4 x MIC). This study was supported by The SLDR - ADB, Loan No. 1013-IND.

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A Relation of Plasma Albumin Level to Calculus Deposit. Y. KENALI*, F. ZAKARIA, SAMJAJA (Universitas Indonesia, Institut Pertanian Bogor, Puslitbang Gizi, Indonesia).

Previous studies have shown that a group of proline rich proteins in human saliva can act as inhibitors of calcium phosphate precipitation in dental calculus formation. Since some of native Indonesians still consume diet with a low protein level nowadays, and the fact that many Indonesians have high score of calculus index, the purpose of this preliminary study was to investigate the correlation between plasma albumin level (as a body protein index) and calculus deposit on the tooth surface. 34 people aged 22-50 years, in Bogor, Indonesia, were subjected in this study. Plasma albumin level was measured using spectrophotometer. Calculus index was used to assess calculus deposit. The result showed that there was significant negative correlation between the plasma albumin level and calculus index ($r = -0.43$, $P = 0.01$). It is concluded that the low plasma albumin level is one of the possible reasons which promote the deposit of calculus on the tooth surface.

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Strength analysis of fixation of sagittal split osteotomy. B. ANUCUL*, P.D. WAITE, J. E. LEMONS and C. VLACHOS (Mahidol University, BKK, Thailand and UAB, Alabama, USA)

Six fresh frozen human mandible were used as three dimensional testing specimens. Bilateral sagittal split osteotomies were performed and 5-mm. advancements were made. The specimens were divided into plate-fixed group and screw-fixed group. All specimens were subjected to repeated compressive loads of 22.27N by using Instron machine. Parameters of strength were analyzed by elastic deformation, stiffness ratio, permanent deformation and breaking load. Data analysis were done by means of two-sided matched pair t-test. The mean elastic deformation under 22.27N was 0.36 ± 0.4 mm in plate group and 0.24 ± 0.24 mm in screw group which were not statistically different ($0.60 < p < 0.80$). There was statistical difference between mean stiffness ratio of the two group ($0.40 < p < 0.60$), while the plate group was 232.58 ± 153.24 N/mm, the screw group was 342.91 ± 195.89 N/mm. The mean load for permanent deformation were statistically different between two groups ($p < 0.001$). The plate group was 16.43 ± 16.39 N, whereas the screw group was 34 ± 5.79 N. The mean breaking load of the plate group was 23.5 ± 5.59 N while the screw group was 63.33 ± 20.38 N. It was significantly three times higher than that of the plate group ($0.01 < p < 0.05$). It is concluded that the bicortical screw fixation can resist higher load than monocortical plate fixation and it takes more imposed load to cause fixation failure in the bicortical screw system than the monocortical plate system.

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Biochemical Differences Between Endochondral Bone and Intramembranous Bone Matrix.
A. TWITTY*, A.M. RABIE and D. SHUM* (Department of Children's Dentistry and Orthodontics, Department of Biochemistry, The University of Hong Kong.)

In a qualitative study, we reported that composite intramembranous bone induced more new bone than composite endochondral bone. In order to elucidate the factors behind the enhanced osteogenic activity of intramembranous bone, biochemical analysis of the extracellular matrices of both types of bone was carried out specifically for the presence of an angiogenic inhibitor. Endochondral bone (femur) and intramembranous bone (mandibles and parietal bone) were harvested from 3-4 month old New Zealand white rabbits. The bone was cleaned, defatted, dried and pulverized (particle size: 60-25mm) before being demineralized in 0.5M HCl. Protein was extracted dissociatively using 4M GuHCl and ultrafiltration was used to give a 10-100kDa molecular weight range. Heparin Sepharose Chromatography further separated the proteins before they were run on 15% SDS polyacrylamide gels under reducing conditions. Preliminary studies have shown that there is a difference in banding pattern between the two bone types with results showing the presence of a 28-29kDa protein in the heparin bound fraction of endochondral bone proteins and an apparent absence from the equivalent intramembranous bone fraction. Further investigations are being carried out to determine the nature of this protein in order to establish whether or not it is an angiogenic inhibitor. This study was supported by RCG Grant # 372/251/6425. University of Hong Kong.

15

Ridge Augmentation and Reconstruction Using Composite Bone Grafts

A.M. RABIE¹ (Department of Children's Dentistry and Orthodontics, The University of Hong Kong.)

The purpose of the current presentation is to introduce the composite autogenous bone graft and demineralized bone matrix to the practising clinician. In this presentation, the biochemical and molecular advances leading to the development of the composite bone graft are highlighted and the different aspects of its clinical application are demonstrated.

The composite bone graft is a mixture of autogenous bone (the patient's own bone) and allogeneic demineralized bone matrix (DBM) (prepared from human cadaver bone or commercially available). Recently we reported that the demineralized bone matrix augmented the healing and integration of autogenous bone grafts. The composite bone graft induced 47% more new bone than the most widely used graft material, the EC bone. In the composite graft, the type of autogenous bone, endochondral (EC) of origin i.e. hip / rib bone graft or intramembranous (IM) of origin i.e. cranial / chin bone graft, affects the integration of the graft with the recipient bed. Composite IM-DBM induced earlier neovascularization when compared with EC-DBM. Furthermore, an ultrastructural identification of cells involved in the healing of IM and EC bone demonstrated that intramembranous bone, unlike EC bone, heals directly through bone bypassing a cartilage intermediate stage. Clinically, implants were inserted within 3-4 months after ridge augmentation using the composite bone graft.

Similarly, in cases of mandibular and maxillary reconstruction implants were inserted within 3-4 months. In conclusion: IM bone heals through an osteogenic route which allows earlier loading of the grafted area. IM-DBM induces early vascularization which is vital to the bone induction ability of the composite graft. Composite bone grafts possess all the properties required for an effective graft material and merit further clinical evaluation.

This study was supported by RCG Grant # 335/251/0023, University of Hong Kong.

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Vascular endothelial growth pattern of composite intramembranous bone and demineralized bone matrix.

Y.M. DENG¹, P.C. Wu² and A.M. RABIE¹ (Dept. of Children's Dentistry & Orthodontics¹ and Dept. of Pathology², The University of Hong Kong).

The purpose of this study was to clarify the angiogenic pattern in the early stages of healing of composite intramembranous (IM) and demineralized endochondral bone matrix (DBM). Fourteen critical-size 10 x 5 mm, full thickness bony defects were created in the parietal bones of mature rabbits. Defects were filled with combined IM-DBM. Tissues were retrieved in 1, 2, 3, 4, 5, 6 and 7 days post grafting. Neovascularization was assessed using antibodies to factor VIII antigen (marker for vascular endothelium) and gap-endothelial antibody (CD-31). Histological and immunohistochemical evaluation of the sequence of the events revealed that: two days after grafting, positive staining for endothelial cells were first observed near the periphery of the host bone rim. Small blood vessels were first seen budding from host bed towards the graft by day 3. At day 4, differentiating chondroblasts were observed. With the advent of capillary invasion on day 6, initial signs of osteogenesis was observed and new bone was formed on the surface of cartilage matrix and the implanted matrix by day 7. In conclusion: this study demonstrates a rapid vascularization during the composite IM-DBM graft induced osteogenesis and provides a further evidence for the potential value of the composite graft.

This study was supported by the CRGC grant 335/251/0023, The University of Hong Kong.

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Two Patient Controlled Sedation Techniques Compared using Graseby PCA Pump.

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In a preliminary investigation, true patient controlled sedation where patients obtain 0.1 mg increments of midazolam without a lockout period was compared with the standard patient controlled technique where they obtain 1 mg increments of midazolam with a lockout period of 1 minute between increments. Eighteen healthy patients undergoing bilateral third molar surgery at two visits were included in the study following informed consent. The total dose of midazolam obtained by patients up to the end of surgery was significantly less with the true patient controlled technique, mean 4.1 mg, when compared with the standard technique, mean 5.2 mg ($p < 0.05$). During true patient controlled sedation the number of demands for the drug far exceeded the increments they received. In both groups the majority of patients were moderately sedated and provided good operating conditions. One patient in the true patient controlled sedation group was considered to be markedly sedated. Almost an equal number preferred each technique. The majority (71%) who preferred the true patient controlled sedation technique said they could control the sedation better with this technique and the majority (56%) who preferred the standard technique said that adequate sedation was attained much earlier than with the other technique. Thus the conclusions of this preliminary investigation are that the so called true patient controlled sedation is a misnomer because even though the patients are able to press the button at any time they wish, they do not get an increment at every time they press the button and that even with true patient controlled sedation patients could become markedly sedated or may even become unconscious. This stresses the importance of having two practitioners one to monitor the patient and the other to perform surgery when patients are allowed to have increments during surgery in patient controlled sedation.

18

CLINICAL EFFICACY OF METAMIZOL IN PAIN AFTER SURGICAL REMOVAL OF IMPACTED WISDOM TOOTH

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This randomized double blind placebo controlled trial was undertaken to investigate the efficacy and tolerability of metamizol 500 mg, mefenamic acid 500 mg, ibuprofen 400mg. Two hundred and thirty nine patients were admitted to the study, but only two hundred and nine patients were included in the final analysis due to protocol violation. They consisted of 51 patients receiving metamizol, 54 patients receiving mefenamic acid, 54 patients receiving ibuprofen and 50 patients receiving placebo. Efficacy was assessed based on 5 point scale measurement of pain intensity and pain relief, every hour during 8 hour period following surgery. The results showed that there was no difference in pain intensity and pain relief between groups. However, significant differences between either drug group were observed as compare to placebo, indicating their analgesic efficacy. The adverse events during the treatment period were not significantly differences between groups. It was concluded, therefore, that metamizol 500 mg, mefenamic acid 500 mg and ibuprofen 400mg, were equally efficacious for the treatment of dental pain after surgical removal impacted wisdom tooth.

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Evaluation of Flexural Strength of Materials for All-Ceramic Restorations.

K. KANCHANATAWEAT*, R. GIORIANO II R. POBER and D. NATHANSON, (Chulalongkorn Univ., Thailand and Boston University, USA).

All-ceramic restorations are increasingly used due to their often superior esthetic qualities. Celay (Mikrona Technologie), IPS-Empress (Ivoclar) and Cerec (Siemens) are novel systems which can produce a variety of ceramic restorations. Celay uses a precise copy milling system, Cerec is a CAD/CAM system while Empress employs a pressure molding fabrication technique. This study investigated the flexural strength of the different types of ceramic used in these systems. The ceramics used are; Type 1) Aluminous porcelain (Vitadur Alpha, Vita Zahnfabrik); Type 2) Dicor-MGC (Dentsply); Type 3) Vitablocs (Vita Zahnfabrik); Type 4) IPS-Empress; Type 5) In-Ceram blocks (Vita Zahnfabrik); and Type 6) Spinnell blocks (Vita Zahnfabrik). Type 3, 5, 6 are specially designed for Celay machine. 10 bars (2.0 x 1.50 x 25 mm) of each type were fabricated. Bars were tested in three-point flexure (crosshead speed 0.2 mm/min) on a universal testing machine (Instron, Canton, MA, USA), according to ASTM Standard C-1161-90. Flexural strengths ($X \pm SD$, MPa) are; Type 1) 64.92 \pm 10.32, Type 2) 231.99 \pm 1161.90, Flexural strengths ($X \pm SD$, MPa) are; Type 1) 64.92 \pm 10.32, Type 2) 231.99 \pm 17.88, Type 3) 119.94 \pm 4.13, Type 4) 98.30 \pm 14.00, Type 5) 384.50 \pm 40.01, and Type 6) 259.10 \pm 31.49. ANOVA and Tukey statistical analyses revealed that In-Ceram was the strongest ($p < 0.05$) ceramic tested and Vitadur Alpha has the lowest flexural strength ($p < 0.05$). Spinnell was the next strongest ($p < 0.05$) one. There was no significant difference ($p < 0.05$) between IPS-Empress and Vitablocs and between Dicor-MGC and Spinnell.

20

Effect of storage condition on mechanical properties of composite resin.

S. MEIANA*, M. YAN, K. TONAMI, N. HABU, H. TAKAHASHI and F. NISHIMURA (Tokyo Medical and Dental University, Tokyo, Japan).

This study was conducted to confirm the effect of storage condition on mechanical properties of composite resins. Three light-activated (CH, ZI, HM) and one chemically-cured (CN) composite resins were selected and tested immediately after being received from their manufacturers (control) and after 6 months storage at 4°C or 30°C. Knoop hardness (KH) of cured composite surface was measured 3 minutes after light exposure or 10 minutes after mixture; direct tensile strength (DTS) was measured using dumbbell-shape specimen after 24 hours storage in 37°C distilled water. Means (s.d.) are summarized in table below and were analyzed with one-way ANOVA and Scheffé's test ($p < 0.05$).

		4°C	30°C	DTS (MPa)	control	4°C	30°C
KH (KHN)	control						
CH		19.7 (0.6)	20.8 (1.7)	21.6 (2.1)	66.9 (7.9)	62.9 (6.6)	60.4 (7.9)
ZI		69.6 (2.1)	61.3 (5.2)	63.9 (5.0)	88.0 (11.2)	67.6 (12.3)	65.0 (6.8)
HM		17.4 (0.5)	17.5 (1.7)	16.1 (2.1)	59.8 (4.9)	57.4 (3.5)	52.7 (8.4)
CN		53.4 (5.0)	34.1 (4.1)	13.0 (1.8)	69.6 (5.3)	70.3 (4.2)	62.2 (7.2)

KH of CH and HM did not show significant difference among storage conditions, while that of ZI (4°C) and CN (4°C and 30°C) decreased after 6 months storage. DTSs of ZI, HM, and CN decreased after 6 months storage, especially at 30°C. These results suggested that storage condition, even for only 6 months, affected mechanical properties of composite resins.

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Effect of Thermocycling on the Fracture Toughness of Composites.

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Fracture toughness has been recognised to be one of the most important mechanical property for restorative materials. It is the aim of this study to investigate the effect of thermocycling on fracture toughness of a range of dental composites: P50(P), Silux Plus(S), Heliomolar(H), Clearfil Photo Posterior-light activated(CLA) and Clearfil Posterior-chemically activated(CC). 110 rectangular pre-notched specimens were prepared for each material utilising a stainless steel mould. The specimens were divided into 11 groups of 10 each. Test groups 1-6 were subjected to 0, 250, 500, 750, 1000 and 10,000 thermal cycles respectively. Each cycle consisted of 1 min immersion time of 50 seconds per change. The control groups 7-11 were stored in water at 37°C for a time equivalent to complete 250, 500, 750, 1000 and 10,000 thermal cycles respectively. All specimens were subjected to a 3 point bend test and loaded at a crosshead speed of 1mm min⁻¹ on an Instron Testing Machine. The fracture toughness of all materials decreases with the number of thermal cycles and length of water storage except for CC where the fracture toughness increases during the earlier stages of thermocycling and water storage. However the lowest fracture toughness values were for groups 6 and 11. One way analysis of variance showed that Group 1 was significantly different from groups 6 and 11 ($P < 0.05$), the thermally cycled and the water storage groups were not different from each other for all materials. The decrease in fracture toughness exhibited by all light activated composites could be explained by interfacial stress formation and resin-filler debonding while the increase in fracture toughness during the earlier stages of thermocycling and water storage of chemically-activated composite be explained by continued polymerisation. Thermocycling did not cause any significant reduction in fracture toughness composites over and above by water storage.

1 3M, MN, 2 Vivadent, Liechtenstein, 3 Kuraray, Japan

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Comparison of Four Microleakage Tracers.

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There is an assumption that different microleakage tests would yield similar results when used to determine leakage of the same restorative material. This in vitro study compared the ability of four different tracers to detect microleakage of amalgam restorations, using the same experimental methodology. Class V amalgam were inserted in extracted human teeth, then stored in water for two weeks at 37°C. Within this period, they were subjected to 2500 thermal cycles at a 40°C temperature differential. Microleakage was tested at the end of the storage period. Fifteen teeth were randomly assigned to one of four test groups: (A) 0.5 percent basic fuchsin dye, (B) 2.0 percent fluorescent dye, (C) 1.5 percent reactive orange 14, and (D) 45Ca. Microleakage was examined at both the cervical and occlusal margins. The Newman-Keuls test was used for multiple comparison of the individual tracers. There was significant difference in the degree of leakage indicated by the four tracers ($p < 0.05$), except for one instance. Only 45Ca and the fluorescent dye (Zygo) indicated the same degree of leakage at the gingival margin. The 0.5 percent basic fuchsin dye indicated the greatest amount of leakage followed in descending order by reactive orange 14, 45Ca and the fluorescent dye. The reactive orange 14 was difficult to evaluate because of its color, making the reliability of scores questionable. With respect to the fluorescent dye, this was sometimes apparent along the axial walls but not at the occlusal or gingival margins. Thus, the source of leakage was not discernible. Overall, the results of this study indicate that the results of leakage studies that have utilized different tracers should not be compared.

23 Esthetic Lip Position to The E Line Based on Javanese Preference.

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Evaluation of esthetics is very subjective and individualistic in nature. Therefore, an objective evaluation from the general public is needed. The purpose of this study was to obtain esthetic lip position based on the E line from the Javanese preference and to evaluate whether the mentioned above esthetic lip position is identical to the Caucasian norm. The study conducted was a descriptive evaluation. The sample of this study consisted of Javanese lay persons selected at random. The 76 samples, 31 male and 45 female had been asked to evaluate the desired lip position on a series of 25 profile drawings. The study revealed that 52.7% preferred a profile with the upper lip position 0.5 mm behind and the lower lip coincident with the E line. The preferred lip position by the Javanese was different from the Caucasian standard. Hence we concluded that the desired lip position based on the Javanese preference was the upper lip position more ahead than the Caucasian standard value.

24 Effect of Cement Thickness on Retention and Seating of Full Crown. M. TUNIPRAWON*, J. PIVRUANG and P. RAKSANTIKUL (Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand)

The objective of the study was to measure and compare the retentive force and marginal discrepancy of full coverage crowns cemented with different thicknesses of glass ionomer luting cement. Fifty-two human molar teeth were prepared for full metal crown (Silver palladium alloys) with 3mm in height and rectangular shape of occlusal surface. The milling machine was used to control the taper angle of axial walls. All the specimens were randomly divided into 4 groups. Group 1, before fabricating of the crowns, each stone die was applied with 2 layers of die-spacer. Group 2, 3 and 4 with 4, 6 and 8 layers respectively. All crowns were luted with glass ionomer cement as recommended by the manufacture. In each group, 3 specimens were sectioned to measure the average cement thicknesses. Ten crowns were used to measure the retentive strength under the Lloyd Universal Testing Machine. The differences of marginal discrepancies before and after the cementation were recorded by Digmatic indicator. The average difference of marginal discrepancy in micrometer (SD) was Group1=24.33 (14.8), Group2=17.88 (8.105), Group3=13.40 (8.74) and Group4=10.8 (7.06). The average retentive force in newton (SD) was: Group 1=404.87 (80.03), Group 2=387.57 (126.48), Group 3=360.79 (75.64) and Group 4=452.11 (103.8). ANOVA and Duncan's Multiple Range Test indicated no significant difference in retentive strength whereas significant difference in vertical marginal discrepancy was found between group 1 and 4 ($p < 0.05$). We conclude that increasing cement space from 2 to 8 layers of die spacer has no effect on retention but improves seating of crowns. (Supporting by Dental Research Fund, Faculty of Dentistry, Chulalongkorn University, Thailand)

25 Microleakage Associated with Cervical and Occlusal Bevelled and Unbevelled Cavities

A.H. ALANI and C.G. TOH* (Conservative Department, Faculty of Dentistry, University of Malaya, Kuala Lumpur, Malaysia)

Microleakage is considered to be a significant problem in relation to the longevity of restorations, tooth discoloration, recurrent decay and detrimental effect upon the dental pulp. The aim of this *in vitro* study was to compare the cervical and occlusal leakage in cavities with bevelled and unbevelled margins. A number of dentine bonding agents (DBA) Gluma¹, Scotchbond², Topaz³ and an experimental material⁴ were used with a posterior composite resin, Occlusin⁵. The results were compared with a glass ionomer, Chemfill II⁶. Class V cavities with bevelled and unbevelled cavo-surface margins were prepared in the buccal surfaces of extracted premolar teeth. Following restoration, the teeth were stored for periods of up to 1 year and then thermally cycled. Marginal leakage, cervically and occlusally was subsequently demonstrated using a radioactive isotope containing Ca⁴⁵, and an auto-radiographic technique. Image analysis was used to evaluate the total amount of linear leakage for each specimen. The results were analysed using a Kruskal-Wallis test corrected for ties. It was found that there was no difference in the marginal leakage between the occlusal and cervical margins of the bevelled cavities for all materials except Gluma ($P < 0.01$). The marginal leakage at the cervical margins of composite restorations in unbevelled cavities was greater than that at the occlusal margins ($P < 0.001$). There was no significant difference between the leakage cervically or occlusally with glass ionomer restorations ($P > 0.05$). It was concluded that glass ionomer cement in unbevelled cavities gave less marginal leakage than composite with or without DBA. The bevelled cavities gave less leakage than unbevelled cavities for composite restorations.

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² 3M Co. St Paul, MN, USA

³ DSD Ltd, London, U.K.

⁴ 3M Co. St Paul, MN, USA

⁵ ICI plc, Macclesfield, Cheshire, U.K.

⁶ De Trey Division, Dentsply Ltd, Weybridge, U.K.

26 Relation Between Students Comprehension With Different Accepted Tooth Preparation Material. KRISNATI D. (Fac. of Dent., Airlangga St. Univ., Surabaya, Indonesia)

It was detected among dental students that they were poor in comprehension of abutment tooth preparation clinically, although before they entered the clinical work session already trained via phantom works. To know whether there was a difference of knowledge comprehension, a questionnaire study was carried out to two different student groups. They were those who in the preclinical training as well as in the clinical training obtained a written guidance material of abutment tooth preparation and those who did not. The participated students in this study all were working at the Fixed Prosthodontics Clinic. The data obtained were tabulated and analysed after scoring the result of the good and wrong answers upon questionnaire to enable the comparison using chi-square test for significant differences between frequencies of the score between the study groups. The findings showed that those who's answers leading to well understanding and comprehension on abutment tooth preparation was the group who had received written guidance material ($P < 0.05$), but not for the group who did not receive the material. The results from this study showed that the students accepting written guidance material had more understanding than those who did not, in abutment tooth preparation to improve the knowledge comprehension on abutment tooth preparation among students on their training. It is suggested giving them an additional guidance material, rather than phantom abutment tooth preparation training alone, to minimize the possibility later on of failures that will be carried out in the clinical abutment tooth preparation.

27 Barriers to Dental Care for the Elderly

N.W. Sriyono* (Dept. of Public Health Dentistry, Faculty of Dentistry, Gadjah Mada University, Yogyakarta, Indonesia).

Previous studies have shown that very poor dental health status with insufficient dental care among the elderly is due to some barriers. As barriers to dental care are still controversial, this study was to determine which barriers cause most insufficient dental care for the elderly. An ex post facto study was conducted on 80 elderly people aged at 56 or over, chosen randomly from the elderly resided less than 1 km from Puskesmas Depok II, Yogyakarta. These samples were interviewed to assess their barriers to dental care: (1) fear and anxiety by using Dental Anxiety Scale from Corah (1969), (2) dental knowledge by using questionnaires modified from Likert Scale (Singarimbun and Effendi, 1987), (3) dental cost by using items modified from Likert Scale, and samples were examined their indication for extraction and filling teeth as the measurement of the dental care dependant variable by using WHO Oral Health Survey Form (1986). Fifty five percent samples showed no fear and anxiety to dental care, 95% samples said that dental cost at Puskesmas was low, but 50% of them never attended dentist anywhere throughout their life although they actually needed dental care. By using logistic regression analysis, those two variables didn't show significant barriers to dental care ($p > 0.05$), while 80% samples held good dental knowledge, but statistically that dental knowledge was a significant barrier to dental care ($p < 0.05$). In conclusion, dental knowledge but not dental cost, fear and anxiety may be the most barrier to insufficient dental care.

28 Oral health care profile of the disabled: Clinical students' perceptions. ABD-HAMID J*, MD-DOM FN, ABDUL-KADIR R. (Faculty of Dentistry, University of Malaya, 50603 Kuala Lumpur, MALAYSIA).

In recent years, there has been increasing recognition in Malaysia that individuals with a disability, whether physical or mental, are entitled to achieve appropriate rehabilitation so as to assist them in "normalizing" their lives. Unfortunately, the dental delivery service system has not been adequately responsive to the needs of this population. It is suspected that lack of interest to manage the disabled is, in part, related to their previous dental education training. In an effort to better understand the problem, a self-administered questionnaire survey to look into perceptions and opinions of clinical dental students towards provision of oral health care of the disabled was conducted. A total of 116 dental students (95.9%) in the clinical years responded to the survey. Findings from the survey indicated that only 8.0% of the students believed that dental care provided to this unique population has been adequate. Some of the factors perceived as barriers include: lack of training and exposure towards the disabled in the dental school curriculum (90.4%), unwillingness to treat due to perceived patient's poor oral hygiene (76.8%), beliefs that guardians and carers do not think that oral health is important (70.5%), and suspicion that guardians have poor knowledge of where to go for dental care (63.8%). The survey also found that at least 25.8% of the students had observed treatment provided by their lecturers, while 67.8% had some experience in providing simple oral care procedure under supervision. In addition, only 8.1% of the clinical procedures observed were done under full sedation. Of those who had the experience to treat these patients, slightly more than half of the students (59.7%) agreed that it took longer to treat the disabled as opposed to normal patients while 22.9% of them felt uncomfortable while treating these patients. Among the reasons cited for the discomfort felt are: communication problems (68.9%), unpredictable behaviour (60%), uncooperativeness (61.4%) and limited operator skills (56.8%). On the question of where or who should provide oral health care, three types of practices were identified as appropriate places namely: teaching institution (84.3%), specialist government clinics (88.9%), and private practitioners (60.7%).

29 NUTRITIONAL STATUS ON CHILDREN WITH DENTAL CARIES STUDY ON CHILDREN UNDER 5 YEARS OLDS

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Nutrition is important for children especially for growth and development. There are some reason that cause the possibility of malnutrition on children such as dental caries. The purpose of this study were to determine the correlation between dental caries and nutrition status on children under 5 years old. The subjects of this study were 1385 children from 1 to 4 years old at Depok suburb of Jakarta, Indonesia. Oral examination had carried out to assess the caries experience (def-t), and KUP for Nutrition status on children. For statistical analysis were used Pearson correlation chi-square and student t-test. The result showed that KUP had significant correlation with def-t ($r = 0.18$, $p < 0.001$). It had also significant differences between low risk group KUP and high risk group caries/def-t ($p < 0.001$). On KUP had also significant differences between boy and girl ($p < 0.01$). Hence, it could be concluded that KUP has good correlation with caries experience on children under 5 years old. Children with heavy dental caries experience, following by bad nutritional status.

30 Relation Between Dental Health and Nutritional Status of Children Under Five Years

H DJOHNAS (Dept of Preventive and Public Health Dentistry, UNIVERSITY OF INDONESIA, JAKARTA)

House Hold Health Survey (1992) showed that nutritional status of a child aged between 24-35 months is almost alarming, and between 12-23 months are the biggest age group with poor nutrition. This condition is even worse in the less-developed villages. The Objective of the research is to know whether there is a relation between tooth decay and nutritional status of the children. For this reason, 489 under five years old children who visited Posyandu from five less developed villages in Kab. Pandeglang and Kab. Serang, West Java, were examined. Present of their teeth either half or full erupted and decay in each tooth are recorded, as well as their Nutritional Status. The findings show that on the Average, number of teeth present in children aged 1-2 years old is 10 ± 4.6 (SD) with average decay 2.9 ± 1.6 (SD), and prevalence caries 13%. Average number of teeth in aged 2-3 years old is 19.0 ± 2.2 (SD) with average decay 3.7 ± 1.7 (SD) and prevalence caries 53%. Although the study found that 4.7% children aged 1-2 years old and 4.2% children aged 2-3 years old has undernutrition, but it was not found in relation with tooth decay ($p > 0.05$), as tested by CHI-SQUARE. Anyway special program should be developed in Posyandu to prevent and overcome the high caries of the children.

31 Oral Health Conditions of Two Groups of Intellectually Disabled Adults L.P. LIM*, B.Y.Y. MOK and H.P.Y. THEAN (National University of Singapore)

The aim of the study is to compare the oral health conditions of 31 young adults with Down's syndrome (mean age 23.8) to that of an age and sex-matched control group presenting with other forms of intellectual disability. All subjects (IQ 35-55) were non-institutionalised and attended the same vocational training centre in Singapore. Periodontal health was assessed using direct vision and the WHO 621 probe around 6 sites of 8 selected teeth. Full mouth examination was carried out for the assessment of dental caries. The results were analysed using Student's t test. The periodontal examination revealed subjects with Down's syndrome presented with higher percentage of sites with bleeding on probing (mean = 73.6), marginal redness (mean = 85.1), probing depths greater than 3.5mm (mean = 61.2); the differences were however only significant for marginal redness and bleeding on probing ($P < 0.01$). The mean DMF of Down's syndrome clients was 10.2 as compared with 9.6 in the control. While subjects with Down's syndrome presented with lower mean number of decayed (D) and filled (F) components, the missing (M) component was significantly higher (mean = 6.6) than the control (mean = 4.1) ($P < 0.01$). The results confirm findings of other studies that Down's syndrome subjects appear to be at higher risk to periodontal disease, there is also a need to implement early preventive oral health care for the intellectually disabled in the community. This study was supported by the Singapore Dental Health Foundation

32 Dental manpower planning in Hong Kong. Lo ECM (Faculty of Dentistry, University of Hong Kong)

For the public health administrators, good planning is essential to prevent severe shortage of dental personnel to cope with the oral health problems of the population. In contrary, an oversupply of dental personnel results in unemployment and wastage of manpower resources. An accurate projection of the supply of and demand for dental care services is an important component of dental manpower planning. Annual output from dental schools, and the work pattern and attrition of dental personnel are important factors to be considered in projecting supply. Population size and composition, oral diseases level and utilization of dental services will influence the demand. Two major dental manpower planning exercises have been carried out in Hong Kong in 1987 and in 1996. A model developed by a joint WHO/FDI working group was used in both exercises to project the demand for dental care from oral epidemiological data. This model was found to be useful and results of the exercises were used as a guide to determine the annual intake of students into the dental school. At present there are about 1,500 dentists in Hong Kong and the population size is 6.2 million. Utilization of dental services among the Hong Kong adults is low, with only about 40% of the middle-aged and 20% of the elderly paying a visit to a dentist within a year. Results of the latest planning exercise showed that the present annual intake of 50 dental students is appropriate and there will not be a great discrepancy between the supply and demand in the next 10 years if there are no drastic changes in the population's demand for care and the attrition rate of dentists.

33 Oral Health and Dental Services Provided in a Capitation Based Youth Dental Care Programme (YDCP) in Hong Kong. E. Schwarz (The University of Hong Kong, Faculty of Dentistry), Hong Kong

Almost 90% of participants in a government School Dental Care Service for primary school children do not see a dentist within the year after promotion to secondary school. A Youth Dental Care Programme (YDCP) was set up to promote continued preventive dental care through an organized transfer from the public clinics to the private dentists. Financing was an annual capitation fee paid by parents. Participating dentists in two pilot districts reported on enrolled students' compliance with recalls and which dental services were provided at the dental visits. Specially produced monitoring cards containing information on the dentist, the student, oral health status (GBI and VPI indices on 6 indicator teeth), and an assessment of the value of the programme for the dentist's practice were distributed to all participating dentists (n=28) with a short explanation. No attempt was made to calibrate the dentists. Information was received from 23 dentists (82%) concerning 66% of the eligible students (n=1024). Most students were accompanied by their mother (70%) and most dentists planned to recall the students (73%). Only around 20% of students had no plaque and 40% were free of gum bleeding. Plaque on all indicator teeth was found in 35% of students and 16% had bleeding gums around all indicator teeth. Most students (92%) received at least one dental care item, dental examination, scaling and polish and oral health education being the most common services. The original purpose of the YDCP, to create a predominantly preventive oriented programme for secondary school students in private practice was fulfilled, however the overall participation rate was only 17%. The main barrier to participation was a low perceived need for dental care.

34 Utilization of Professional Dental Care Among Mothers. NURMALA SITUMORANG* (University of North Sumatra, Faculty of Dentistry, Medan, Indonesia).

The available literature indicates that dental care utilization is low relative to the utilization of other types of medical services. To identify factors which are related to utilization of professional dental care as to support major policy at various level of the dental care structure, a study was carried out in the district of Medan Kota among 275 mothers with dental symptoms one month before the study was done. Sampling was conducted with a two-stage cluster, and respondents were interviewed in their home using interview guide. A combination of univariate, bivariate and multivariate analyses (Multiple logistic regression) was used. In the episode of dental symptoms, mothers responded in various ways: 11.30% seeking professional care only, 12.40% nonprofessional care only, such as self-medication, 65.50% both professional and nonprofessional care, and 10.90% taking no care. Among various factors it was found that need factor (DMF-T) was to be the most important factor in seeking professional dental care. The magnitude of association (Odds ratio) indicates that mothers with more number of DMF-T were 2.60 times more likely to seek professional dental care than mothers with less number of DMF-T ($p = 0.003$; confidence interval: 1.37 ; 4.92), while attributable-risk percentage = 61.53%. We conclude that mothers with more number of DMF-T tend to seek professional dental care. A possible strategy would be the implementation of dental screening in the detection and evaluation of clinical dental conditions of mothers. This study was supported by The Department of Dental Public Health, Faculty of Dentistry, University of North Sumatra.

35 THE IMMUNOGLOBULIN-A LEVELS IN SALIVA OF SMOKERS AND NON-SMOKERS. R. FARIDA* (University of Indonesia, Jakarta, Indonesia)

The adverse effects of tobacco smoking on health are well known. Previous studies in subjects with a high standard of oral hygiene have shown a greater bone loss in smokers than non-smokers. The aim of this investigation was to determine the IgA levels in saliva of smokers and non-smokers with gingival health and disease, also with enamel caries, by turbidimeter. The study group consisted of 58 healthy dental students, 27 of whom were regular smokers. The clinical parameters studied of gingivitis were gingival bleeding on probing, gingival redness and gingival exudate. Whilst, the other group studied was with dentine caries. The results showed that the smokers with gingivitis had lower IgA levels in saliva (54.74 IU/ml) compared with the non-smokers with gingivitis (107.84 IU/ml). Furthermore, the smokers with healthy gingiva had lower IgA (37.18 IU/ml) as compared with the non-smokers (68.8 IU/ml). Finally, lower IgA in saliva was also found in smokers with dentine caries (51.99 IU/ml) than in non-smokers (98.45 IU/ml). These differences were significant ($p < 0.001$) as tested by ANOVA. Therefore, we conclude that smokers have reduced immune response.

36 Effectiveness of toothbrushing using the Roll and the Free methods in decreasing gingival inflammation. SETIYOHADI* and KRISNAMURTHY (Faculty of Dentistry, Trisakti University, Jakarta, Indonesia).

The effectiveness of toothbrushing using the Roll method compared to the free method is still controversial. This study was undertaken to evaluate the effectiveness of both methods in decreasing gingival inflammation. Sixty subjects of the age group 11 to 12 years with Papilla Bleeding Index (PBI) = 1 - 2 were divided into two groups, each group consisting of 30 subjects. The first group received a daily professional toothbrushing treatment with the Roll method and second group with Free method. Two weeks later, the subjects were assessed for their decrease in gingival inflammation. Data were evaluated statistically, resulting in a highly significant decrease ($p < 0.01$) in gingival inflammation in both groups. There was, however, no significant difference in the decrease of gingival inflammation between the groups ($p > 0.05$). It can be concluded, therefore, that the Roll and Free methods of tooth-brushing have equal effectiveness in decreasing gingival inflammation.

37 Serum Immunoglobulin G Levels in the Gingivitis and Periodontitis Predilection Areas. M. H. SADONO*, I. RIANASARI, and B. Oe. ROESLAN (Faculty of Dentistry, Trisakti University, Jakarta, Indonesia).

The development of the gingivitis into periodontitis may be caused by failure of the host immune responses. The aim of this study is to know the difference of serum IgG levels in gingivitis and periodontitis. Serum IgG levels were measured from 6 gingivitis and 6 periodontitis patients and the severity of periodontal diseases were determined by Periodontal Disease Index. Blood were collected directly from predilection area using specific foam containing EDTA and the IgG assay was performed by using radial immunodiffusion in a single blind method. It was found that serum IgG level in the gingivitis predilection area (9.45 ± 2.54 mg dl⁻¹) was significantly lower ($p < 0.01$) than in the periodontitis predilection area (16.75 ± 2.36 mg dl⁻¹) as tested by Student's t-test. Serum IgG level in the predilection area can also be used to predict the severity of periodontal diseases (R-square = 0.9458; $p < 0.01$) as analysis by regression. Hence it was concluded that the development of the gingivitis into periodontitis is not caused by decreasing production of serum IgG in the predilection area and serum IgG level can be used as indicator of the severity of the periodontal diseases.

38 Stress and Severe Periodontitis in Thai Population. N. Hongprasong*, V. Buatongsri, P. Phantumvanit, Y. Songpaisan, & N. Clarke (Fac. of Dent. Chulalongkorn Univ. Fac. of Publ. Hlth. Mahidol Univ. & Fac. of Dent. Univ. of Adelaide)

Since severe periodontitis had been found in developed countries similar to those in developing countries, stress is convinced to be one of modifying factors of this disease. The purpose of this study was to examine whether stress relates to severe periodontitis in the risk group population. The urban group with CPIITN4 was selected from workers in the banking and teaching professions (111) while rural group (248) was chosen from 4 villages in Chiangkam, Prayao province. The Spielberger Trait Anxiety index (20 questions with a potential score ranging from 0-60) was used as stress index and the relationship between stress and severe periodontitis was assessed. It was found that in urban group had greater number of high stress than rural group (93.7% VS. 80.2%) although urban group had lesser number of severe periodontitis than those in rural area (17.0% VS 27.9%). There was no significant difference between the percentage of CPIITN 4 persons in low and high stress group in urban and rural areas (33.3% VS 27.85 and 38.2% VS 35.17%). It seems no relationship between stress and severe periodontitis, however other risk factors should be considered. Supported by Chulalongkorn University Rajadapisek Sompot Research Fund.

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Elastase activity in static and flow gingival crevicular fluid from subjects with periodontal disease
C. YU*, L.J. JIN and E.F. CORBET. (Dept. of Periodontology & Public Health, The University of Hong Kong, Hong Kong).

Gingival crevicular fluid (GCF) has been highly implicated as a promising medium to be used for early identification of periodontal destruction and for monitoring treatment response. Most commonly, the initial GCF sample (static GCF, sGCF) is collected for analysis, while the subsequent flow sample (fGCF) has been utilized as an alternative. The aim of this study was to investigate the volume and the elastase activity levels in sGCF and fGCF collected from subjects with various periodontal status. The following different categories of sites were investigated: healthy sites from healthy (H-H), gingivitis (H-G) and periodontitis subjects (H-P); gingivitis sites from gingivitis (G-G) and periodontitis subjects (G-P); and periodontitis sites from periodontitis subjects (P-P). The samples were collected by placing a paper strip inside the gingival sulcus / pocket for 30s. The fGCF samples were taken either 1 min (fGCF1) or 5 min (fGCF5) following the sGCF collection. The volume of each sample was determined by Periotron® 6000. The total elastase activities in supernatants were analyzed with a low molecular weight substrate specific for granulocyte elastase (S-2484). Both mean GCF volume and total elastase activity levels from periodontitis subjects were significantly higher than those from healthy or gingivitis subjects ($p < 0.05$). No significant difference was found between sGCF and fGCF volume, except for lower fGCF1 volume from H-H sites ($p < 0.001$). The elastase activity levels in fGCF samples were significantly less than those in sGCF samples, except the fGCF5 samples from G-G, H-P, G-P, and P-P sites ($p > 0.05$). The present results indicate that the GCF volume and elastase activity levels are related to periodontal status. The dynamic changes of GCF-granulocyte elastase activity may reflect the specific host response in subjects with periodontal diseases.

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40

Clinical and Microbiological Effects of Metronidazole Dental Gel in Treated Adult Periodontitis Subjects
D.H.LEE*, K.Y. ZEE, E.F. Corbet (Department of Periodontology & Public Health, The University of Hong Kong)

The aim of this study was to evaluate the clinical efficacy of metronidazole 25% dental gel as compared with subgingival scaling in treated adult periodontitis. Ten adult periodontitis patients, who had been treated with nonsurgical periodontal therapy, and who presented with at least 1 site per quadrant with a residual probing depth ≥ 5 mm were selected to participate in this randomized clinical study with a split-mouth design. Probing pocket depth (PPD), probing attachment level (PAL), bleeding on probing (BOP) and visual plaque index (VPI) were measured before, and at 4, 12 and 24 weeks after treatment. Subgingival plaque samples were taken from one selected site in each quadrant before, and at 1, 3, 12 and 24 weeks after treatment. Samples were silver-stained and analyzed under light microscope. Four treatment modalities, viz. oral hygiene alone, metronidazole gel alone, subgingival scaling alone and gel plus subgingival scaling, were randomly assigned to quadrant 1, 2, 3 or 4. Results at the end of 24 weeks showed that subgingival scaling and gel plus subgingival scaling produced statistically significant greater reductions in mean PPD and PAL compared to gel and oral hygiene. Moreover, gel, subgingival scaling and gel plus subgingival scaling were more effective in reducing spirochaetes and curved rods compared to gel and oral hygiene in week 4, but the differential counts became similar for all groups in week 24. Results of the differential counts showed a marked decrease in relative percentage of spirochaetes and motile rods from 28-45% to 3-8% in the first week, but gradually increased to 14-22% by week 24. From the 24 week results, metronidazole gel alone does not seem to be effective in treating residual pockets in treated adult periodontitis subjects.

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Dynamic activity of gingival crevicular fluid elastase in subjects with adult periodontitis.
L.J. JIN*, W.K. LEUNG, L.P. SAMARANAYAKE and E.F. CORBET.
(Periodontology & Public Health and Oral Biology Unit, The University of Hong Kong).

The aims of this study were to investigate *in vivo* dynamic activity of gingival crevicular fluid (GCF) elastase in subjects with advanced adult periodontitis (AP), and to determine the initial effect of scaling and root debridement on elastase activity. Granulocyte elastase was assessed in GCF collected from sites with various clinical signs in 9 advanced AP patients (mean age 43.1±5.7 yr) at baseline and 1 month after a course of scaling and root debridement. Dynamic elastase activities in supernatants were analyzed with a low molecular weight substrate specific for granulocyte elastase (S-2484). 5 distinct time-dependent dynamic patterns of elastase activity were identified and the maximal rate of elastase activity (MR-EL) in each pattern was calculated. Significant differences in clinical parameters were found among the 5 patterns ($p < 0.05$). MR-EL and maximal elastase level at 5 hr were both significantly correlated with Probing Depth (PD), Bleeding on Probing (BOP), and GCF volume ($p < 0.01$). According to the 1-month treatment response (pre- / post-therapy) the non-responding sites (PD ≥ 5 mm, BOP+ / PD ≥ 5 mm, BOP+) had significantly higher MR-EL than responding sites (PD ≥ 5 mm, BOP+ / PD ≥ 3 mm, BOP-), both at baseline ($p < 0.01$) and after treatment ($p < 0.001$). In conclusion, the dynamic patterns of granulocyte elastase activity in GCF are related to both periodontal status and the 1-month treatment response. The proposed measure of MR-EL may prove to be a sensitive parameter in monitoring periodontal status and predicting response to initial periodontal therapy.

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42

Calculus and gingival bleeding in incoming dental students 1980 - 94.
E.F. Corbet (Faculty of Dentistry, The University of Hong Kong)

In 1980 the first students commenced dental studies in Hong Kong. At that time there were only 640 registered dentists in Hong Kong and a school dental care service for primary school children had just commenced a phased introduction. Since that time the school dental care service has been fully established, the Government has established, in 1988, an Oral Health Education Unit and the number of registered dentists has risen, by 1994, to over 1,400. All incoming dental students, as part of an introduction to oral health during their first week of studies, receive a periodontal examination performed by Faculty staff. The aim of this study was to monitor the calculus and gingival bleeding of incoming dental students over the period 1980 - 94 to test whether the increased availability of oral health promotion and care services had any effect on calculus and gingival bleeding in this selected population. The periodontal examinations included probing the gingival sulcus of each tooth at six sites. The presence of calculus or bleeding at any site resulted in the tooth being scored positive. For the years 1980-82 a mean of 37.6% of teeth were found to have calculus and a mean of 37.7% of teeth to exhibit gingival bleeding. By the years 1992-94 the proportions of teeth affected had reduced to a mean of 30.8% for calculus and 31.2% for bleeding. It was concluded that the increased availability of oral health promotion and care services were reflected in reduced calculus and gingival bleeding in incoming dental students but that further oral health promotion activities for Hong Kong youth appear to be indicated.

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The Effect of Sodium Fluoride (NaF) on *Porphyromonas gingivalis*-stimulated murine splenocyte proliferation. W. SOSROSENO* (Faculty of Dentistry, Gadjah Mada Univ., Yogyakarta, Indonesia)

Fluoride, known as an anti-dental caries agent, has potential adverse effects on the host tissues. The aim of this study was to determine the effect of NaF on the murine cellular immune response stimulated with *Porphyromonas gingivalis*-derived outer membrane proteins *in vitro*. Balb/c mice were immunized with PBS (as a negative control) and *P. gingivalis*-derived antigens (as a positive control). Spleen cells were cultured and stimulated with antigens. Different NaF concentrations (10^{-4} M, 10^{-3} M, 10^{-2} M, and 10^{-1} M) were added to the cell cultures. CD4 cell depletion carried out by injecting anti-murine CD4 cell monoclonal antibodies was employed to determine the mechanism of NaF-induced cell proliferation. In addition to two experimental groups as described above, mice were injected with the respective antibodies prior to immunization with antigens. A colorimetric method was used to determine the cell proliferation following a 3 day period of culture. The results showed that at low NaF concentration, increased cell proliferation as seen in the positive control was observed ($p < 0.01$). In contrast, suppressed cell proliferation could be detected in high NaF concentration ($p < 0.01$). Both Up- and down-regulation of the cell proliferation were independent upon the role of CD4 cells. It can be concluded that NaF could act as either an immunostimulant or an immunosuppressive agent in a dose-dependent fashion and that this agent would function as a polyclonal activator on the induction of *in vitro* cellular immune response in the murine model. This work was supported by The GMU Research Fund.

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Histopathological Appearance of Caries-like Lesion of Enamel *in vitro*. A.T. SARWONO*, (Dept. of Oral Biology, Faculty of Dentistry, Univ. of Indonesia, Indonesia).

The initial stage of caries, has hitherto been considered as the white spot lesion. To understand the established subsurface lesion *in vivo*, we exposed human premolars to *Streptococcus mutans* FA-1 (ATCC 19645) *in vitro* with and without NaF. Sixty four caries-free teeth divided into two groups. One groups treated with NaF as control and test groups without NaF. Both groups were incubated in medium inoculated with *Streptococcus mutans* FA-1 (ATCC 19645) for periods of four to eight weeks. Lesions progress were assessed using zoom-stereo microscopy and polarized light microscopy. Subsurface porosity increased in each system, especially teeth treated without NaF. Formation of the zone of the classical 'white-spot' carious lesion were similar with or without NaF as tested by Chi-square ($p < 0.05$). Examination of ground sections from both specimens showed similar typical caries-like lesions. This suggests that initial opening up of the surface is a prior step to the subsequent progression of subsurface demineralization and that the presence of NaF resulted in only partial inhibition of lesion formation.

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Diet and dental caries in Melbourne adolescents: Baseline measures. JA CONN*, MV MORGAN*, RWEVANS*, MJ WATSON*, FJ CUMMING* (The University of Melbourne, Deakin University)

The relationships that exist between dietary intake and dental caries are of continuing interest - particularly in an era of widespread fluoride availability. This ongoing longitudinal study is being undertaken in a sample of year seven students (12-13 years of age) in lower socio-economic areas of Melbourne, Australia to investigate the impact that diet has on oral health. The objectives of this study are three fold: (1) to establish the prevalence of dental caries experience in a population based sample of adolescents and measure the incidence over a 36 month period; (2) to estimate the food and nutrient composition in this group using a 4 x 4 day diet record over this same period; (3) to identify key features of the diet contributing to the development of caries. This paper presents baseline levels of dental caries and a number of physiological measures in the adolescent group. A comparison is made between these baseline measures and recent Australian data. Using a random selection process, 642 students (mean age 12.6 years) from 33 Schools, were initially enrolled in the study. The dental caries experience at baseline was 0.98 DMFT (1.72 DMFS) with females having a non statistically significantly higher experience than males. In 1995, the DMFT for Victorian 12 year olds was also 0.98 (Health and Community Services, 1995). The Body Mass Index (BMI) for the study population was 20.2 compared with 19.2 in Australia (Australian Health and Fitness Survey, 1985). The dental health status and BMI measures are not substantially different to that reported in either Victoria or Australia indicating that the study population may be considered representative of the general population. This study is supported by NH&MRC (PHRD), Grant No 4 21074.

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A community assessment of the potential impact of a fissure sealant policy. ISA NM, JAAFAR N*, ABDUL-KADIR R.
Dept. of Community Dentistry, Dental Faculty, University of Malaya, 50603 Kuala Lumpur, Malaysia.

Fissure sealants, although proven to be a very effective clinical preventive measure, are not necessarily a cheaper alternative as compared to conventional fillings on a community basis. Certain conditions in epidemiological trends of dental caries must be fulfilled before it can be justified as a cost-effective public health measure. The aim of this study is to assess the potential benefit of using fissure sealant to reduce the DMFT index in the first permanent molar. A random sample of 602, 12 year old schoolchildren were examined clinically and their past treatment records scrutinized. The overall caries experience was very low (DMFT 1.34 ± SD 1.42). Almost 70% of the first permanent molars were caries free. Of the teeth which were carious, the most caries prone were the lower molars (43%) as compared to the uppers (20%). The most common site affected were the pit & fissures (77%). Fifty percent of the caries occurred about 3.5 years after eruption. However almost all (99.4%) had been filled with amalgam thereby contributing to the DMFT index. Therefore, it is concluded that given this scenario, the selective use of fissure sealants in this population is justified in order to bring down further the level of DMFT. The optimum time of placement of fissure sealant should be within 3.5 years of tooth eruption. Guidelines affecting the decision to adopt fissure sealants on a community basis will be discussed.

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EVALUATION OF DENTAL AND ORAL DISEASES.

P. Janczar (Faculty of Dentistry, Prof Dr Mustopo University, Jakarta - INDONESIA).

For the success of a treatment, it is important to understand the patients' perception of dental and oral problems and the responses to them. The study intended to provide a better understanding of the patients' perception of the severity of dental and oral diseases. The data were collected from patients visited FKGM (B) Dental Clinic in Jakarta, mostly the middle to lower class people. Ten signs and symptoms of oral and dental and 3 oral functional disturbances were arranged in all possible pairs, and the patients were asked to judge which member of each pair was more severe. Formulation of the signs and symptoms and the functional disturbances based on the experiences of the dentists who supervised the clinic. From 81 patients filled in the questionnaire, the rank order of perceived severity of dental signs and symptoms is as follow: Tooth aches/throbs for no apparent reason, Tooth decays until only the root remains, tooth hurts to not eat cold food/drink, Tooth cavity, Gums sometimes hurt, Gums sometimes bleed, Bad breath, Loose tooth, Broken/chipped tooth, and Calculus, and by the method of paired comparisons, the scale is: 1.7, 1.4, 1.3, 1.3, 1.2, 0.9, 0.8, 0.7, 0.5, and 0.4 respectively. The rank order of perceived severity of oral functional disturbances is to Mastication, Speech and Esthetics, with the scale 1.65, 1.1, and 0.55 respectively. The patients seem to judge the severity rather from the painful phenomenon. The patients' perception of the severity is different from that of the dentists' point of view based on dental biomedical concepts.

(Scale construction: test of the significant $p < 0.05$, internal consistency check by $\chi^2 p < 0.05$).

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Need and Demand of Dental Services in the Elderly Officials of Chulalongkorn University. P. SALUKEE, Assoc. Prof. Dr. Tanyapong P. TAECHAKAMPUCH, D. KORKONGWISARUT, and S. WROADCHANASAK.

(Department of Prosthodontics, Chulalongkorn University Faculty of Dentistry, Thailand).

The elderly population tend to increase nowadays with remaining of more natural teeth. Thus, the information about the elderly patient are necessary to prepare for their dental services. The purpose of this study is to evaluate the need and demand of the dental services of the elderly officials of Chulalongkorn University (55-60 years) and the retired officials (61-70 years). The questionnaires which consist of personal history, oral condition and prosthesis, TMJ problems and the attitude in dental services were distributed to the subjects during January and February 1996. 319 (47%) of them were returned and evaluated.

84% of the subjects graduated the bachelor degrees or higher. 67% have systemic diseases while 53% have periodically drug intake. Concerning their oral condition, 52% have more than 10 of the maxillary teeth while 55% have more than 10 of the mandibular teeth. 50% of subjects wear the removable partial dentures while only 2% wear complete denture. For the TMJ problems, the working officials have more problems than the retired ones (47% and 37%, respectively) and the symptoms are likely to occur in women more than men (50% and 36%, respectively). 59% of the subjects received their dental services from the private hospitals or dental clinics. However, the working officials received their services from the dental faculty hospital more than the retired officials. The inquiry of the systemic diseases or drug intake should be considered carefully in the dental treatment for the elderly patients. The demand of partial dentures (fixed or removable) tends to increase for the elderly patients. (Supporting by Dental Research Fund, Faculty of dentistry, Chulalongkorn University).

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Distribution of NOS, GluR1 and NMDAR1 in Spinal Trigeminal Nucleus.

J.F. Yeo, F.R. Tang and S.K. Leong. (1 Department of Oral and Maxillofacial Surgery, 2 Department of Anatomy, National University of Singapore, Singapore).

Nitric oxide (NO) has been implicated mediating of thermal hyperalgesia in neuropathic pain. Recent studies suggest that nociception in the trigeminal nuclear complex is mediated by excitatory amino acid. Thus the identification of different subtypes of glutamate receptors and their relationship with NO is useful for understanding the signal transmission in sensory signal transduction pathways. Combined nitric oxide synthase (NOS), glutamate receptor subunit 1 (GluR1) and NMDA receptor subunit 1 (NMDAR1) immunohistochemistry in 5µm thick adjacent sections of the medulla oblongata of rats showed that in lamina I of the caudal spinal trigeminal nucleus (STN), there existed some moderately to densely stained NMDAR1-like immunoreactive cells. In lamina II of the STN, there existed some NOS-, GluR1- and NMDAR1-like immunoreactive neurons. Of these positive neurons, immunoreactive product was strong for NOS, moderate for GluR1 and weak for NMDAR1. In the magnocellular part of STN, many NMDAR1-like positive cells were seen, but only few NOS and GluR1-like positive neurons were demonstrated. In lamina II of the STN, moderately to densely stained GluR1-like and weakly to moderately stained NMDAR1-like positive fibers were demonstrated. On comparing with those of GluR1-like and NMDAR1-like immunoreactive fibers, only a few moderately stained NOS-like immunoreactive fibers were shown. These observations suggested the existence of different functional groups of neurons in the STN. Compared with NMDAR1, GluR1 may play a more important role in the transmission of orofacial sensation. This study also suggested that as a neurotransmitter in the STN, glutamate might play a more important role than nitric oxide. This project was supported by a research grant (RP940330) from National University of Singapore.

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Mandibular movement velocity difference between TMD patients and non-TMD subjects. C.Z. Wu*, S.L. Chou. (Taipei Medical College School of Dentistry, Taipei, Taiwan, R.O.C.)

Previous studies have elucidated the variation of mandibular movement velocity among normal subjects (C.Z. Wu J. Dent. Res. 72:836, 1993). However, the variation of mandibular movement velocity in TMDs patients is unclear. The aim of this study was to compare the velocity difference between TMD patients and non-TMD subjects. Twenty-five TMD patients and twenty-five non-TMD subjects with comparable age (ages ranged from 21 years to 26 years) joined the study. Myotronics Kinesigraph K-6 model was applied for the measurement of jaw motion velocity. Each subject was instructed to open and close the mouth as fast and wide as possible, ten continuous open-close strokes were recorded and processed for the following parameters (1) the maximal opening and closing velocity, (2) the average opening and closing velocity and (3) the maximal terminal velocity 1 mm before tooth contact. Mean velocity and the standard deviation were used for comparing the results by independent group analysis. Analysis of data indicated that the velocity of the opening phase was faster in the TMD group than in the non-TMD group ($P < 0.05$). In conclusion, under the condition of this study there existed a small velocity difference only in the average opening velocity between two groups. The TMD patients probably had the same mandibular movement velocity variation as the normal subjects. This study was supported in part by NSC-85-2331-B-038-033 and TMC research grant 83-D117.

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Effect of Unilateral Chewing on Pressure Pain Thresholds in the Normal Jaw Muscles. P. VANICHANON*, R. PRAWEENMET, and T. SOPONSUKULKEAW (Chulalongkorn University, THAILAND)

Earlier studies have suggested that different motor tasks may have some influences on the muscle sensory thresholds. However, data regarding the effect of dynamic jaw function on pressure pain thresholds has not yet reported. The intent of this study is to determine whether pressure pain thresholds in the normal jaw muscles could be affected by unilateral chewing and if there is jaw pain elicited thereafter. Twenty-one healthy subjects (19 females and 2 males; mean age = 19.9 ± 0.7 years) participated in this study. PPTs were measured at the temporalis (T) and the masseter muscles (M1, M2, M3) on both sides before and after unilateral gum-chewing for 15 minutes. After the task, subjects were asked to report their pain intensity (PI) on 100 mm visual analogue scale for both chewing and non-chewing side. Although PPTs of the chewing side appeared to be lowered, data analysis using paired t-test revealed no significant difference between PPTs measured before and after unilateral chewing for both chewing and non-chewing side at all recording sites ($P > 0.05$). At the end of the task, 85.7 percents of the subjects reported jaw pain in the working side (mean PI = 39 ± 28) and 33.3 percents had pain in the non-working side (mean PI = 25 ± 26). It can be concluded that 15-minute unilateral chewing had no significant effect on PPTs in the normal jaw muscles (temporalis and masseter). However, such task could elicit jaw pain on both sides to some extent. This study was supported by Dental Research Fund 1995, Chulalongkorn University).

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Retention from Wrought Wire and Acrylic Resin Denture Base at Several Degree of Undercut. P. PHANKOSOL*, N. THOMRONGANANSUKI, R. KONGPITAKSUKUL, S. PREMISARAKUL (Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand)

Gaining into Undercut area of natural teeth by denture base and wrought wire provides the main retentive force for acrylic resin partial denture. This project was designed to study the retention provided by wrought wire and acrylic denture base at several degrees of undercut. One hundred and thirty samples were divided into 4 groups: acrylic base covered only second premolar, only first molar, both second premolar and first molar and using wrought wire. The retention of acrylic base were studied at different degrees of undercut: 0.03, 0.02, 0.01" and at the survey line. The retention of wrought wire was measured at 0.03" undercut of first molars and with 0.9 cm. diameter stainless steel wires. The result showed that the retention ranged from 0.15 to 10.53 kg. Two way analysis of variance and Duncan's new multiple range test ($p < 0.05$) showed that the retention in the same tooth but different degrees of undercut were significantly different. As expected, the undercut 0.03" provided a highest retention and then followed by 0.02, 0.01" and at the survey line. The retention in the same degree of undercut but different teeth were also significantly different. Interestingly, the retention provided by wrought wire was the least of all. It was concluded that wrought wire does not provide better retention than acrylic base. Consideration for retention needed is important for the design of acrylic resin partial denture. This study was supported by Chulalongkorn Dental Research Fund.

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Ultrasonic Pulse-Echo Measurement of Maxillary Palatal Mucosa of Young Adults Keng S B and Tan K B C (Faculty of Dentistry, National University of Singapore)

A study on the palatal mucosa thickness of a group of young adults was conducted using an ultrasonic pulse-echo technique. The Krupp SDP Probe with ultrasonic shock wave transducer running at 5 MHz has a measuring range of 0.5 to 8.0 mm at sound velocity of 1.518 m/s with a measuring resolution of 0.1mm. Using a piezoelectric crystal, ultrasonic pulses are transmitted through the sound permeable mucous membrane. By timing the reflected echo, the thickness of the membrane is determined. The sample consists of 50 young adults with healthy intact occlusion (mean age 22.6 ± 1.7 years). 21 points on the slopes of the palatal mucosa at 3 positions (lower, mid and upper) at the mid-incisal, canine, 2nd premolar, 2nd molar of right and left palatal slopes were measured. The battery operated instrument provided good mobility and ease of operation. The results of the mean mid-region measurements (pooled right and left sides) were Incisor (2.05 ± 0.66 mm), Canine (2.48 ± 0.46 mm), Premolar (2.80 ± 0.43 mm), Molar (2.96 ± 0.70 mm). Previous measurements on palatal mucosa by Kydd and Daly (1971) gave mean readings of 2.2 to 4.0 mm. Measurements at the lower third of palatal slope of molar were 4.45 ± 0.98 mm. Statistically significant differences were observed between the mucosa of canine and premolar ($t = 6.07, p < 0.001$) and premolar and molar ($t = 2.30, p < 0.05$). The greater thickness at the lower portion of molar slope of 4.45 mm could be attributed to the granular and fatty tissue components in this region. The instrument can be a useful clinical tool in estimating oral mucosa thickness and the results of the study could be useful indicators in understanding the load bearing potential of mucosa. This study was supported by NUS research grant RP 950319.

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Complete denture wearer's satisfaction determination of a socio-psychological aspect. ARIFZAN RAZAK (Faculty of Dentistry, Airlangga University, Surabaya, Indonesia).

Complete denture wearer's satisfaction is still a dilemma, although the dentures were made from good qualities and fabricated according to the standard procedures still not all patients were satisfied with their dentures. Some previous studies proclaimed that the success of complete dentures were influenced by the social and psychological make up of the patients. This study determined the effect of socio-psychological aspects (age, sex, occupation, income, marital status, education, attitude and motivation, depression and anxiety) and quality of complete dentures (retention, stability, and irritation to the oral mucosa) to complete denture wearer's satisfaction (function, comfort, and esthetic). Structured quasi-experiment was established on 107 subjects. These patients were from the clinical prosthodontic department of a faculty of dentistry at Surabaya. All patients must meet certain requirements. This study was completed at 3 stages. First, before the complete dentures were fabricated. Second, after the complete dentures worn by the patients without any complaints. Third, after patients wearing the dentures for two months. The quasi-experiment were analyzed by manova. This study concluded that depression and anxiety influenced complete denture wearer's satisfaction on function, comfort, and esthetics (p level: function = 0.002, comfort = 0.002, esthetics = 0.002). Furthermore, occupation and depression (p level: function = 0.048, and differences in sex, and depression (p level: function = 0.048) influenced complete denture wearer's satisfaction. Comfort is prone to be better on satisfactory of complete denture wearers (p comfort = 0.001, 0.006, 0.006).

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Cytotoxicity of Polyester to Human Cultured Lymphocytes.
W. SISWOMIHARDJO, HARSINI and S. SUNARINTYAS (Gadjah-Mada University, Yogyakarta, Indonesia).

Acrylic resin has been the only polymeric denture base material. According to Tsuchiya et al. (J Prost Dent 71: 618-630, 1994), residual monomer (polymethyl methacrylate) elicits irritation of the oral mucous. Siswomihardjo (preliminary study, 1994) states that polyester, a polymeric material for statues, can be manipulated to denture base. This study examined the cytotoxicity of polyesters to cultured human lymphocytes. Specimen of polyesters soaked in human saliva for 24 hours during a period of 7 days. Seven dishes of cultured human lymphocytes were treated with 5 % human saliva (polyesters' soaking solution), and one dish as control. After 24 hours incubation, the number of living lymphocytes were counted by a haemocytometer. Data analyzed by the Anova showed no significant influence of soaking period on the cytotoxicity of polyesters ($p > 0.01$). It can be concluded that in a period of 7 days, polyesters denture base will not cause toxic effect.

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Water Storage Effect on Diametral Tensile Strength of Glass Ionomers.
D. IRNAWATI (Gadjah Mada University, Yogyakarta, Indonesia).

The objective of this study was to measure the diametral tensile strength (DTS) of resin-modified glass ionomer (RMGI) and conventional glass ionomer (GI) restorative materials after stored in water over time. Eighty disk (6x3 mm) samples were made of IonositFil (RMGI) and AlphaFil (GI). The RMGI was photocured for 40 seconds. The samples were stored in distilled water at 37°C for 1 day, 1 week, 4 weeks, 8 weeks and 12 weeks. The DTS was measured by Universal Testing Machine at crosshead speed of 0.5 mm/min. The mean and standard deviation of DTS (kg/cm²) were:

Water Storage	IonositFil	AlphaFil
1 day	119.4 ± 7.2	72.8 ± 10.5
1 week	119.6 ± 6.9	79.4 ± 11.2
4 weeks	128.2 ± 13.5	105.5 ± 7.7
8 weeks	138.5 ± 18.0	108.4 ± 8.7
12 weeks	173.1 ± 10.1	111.3 ± 16.4

Anova and LSD-test were done. The RMGI had higher DTS than GI ($p < 0.01$). The DTS of RMGI increased from 8 weeks to 12 weeks and GI from 1 week to 4 weeks ($p < 0.01$). In conclusion, the glass ionomers did not show any loss after stored in distilled water up to 12 weeks.

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The Interface between Affected Dentine and Resin-Modified Glass-ionomer.
H.K. YIP* (Department of Conservative Dentistry, Faculty of Dentistry, The University of Hong Kong, HK).

Dentine remaining after chemomechanical caries removal by N-muonochloro-D,L-2-aminobutyric acid (NMAB) and urea containing NMAB (NMAB-Urea) was considered sound by clinical criteria. Studies using scanning electron microscope and electron probe microanalysis have showed that the cavity floor, i.e. affected dentine, after complete caries removal to be of similar mineral content as the underlying sound dentine (Caries Res 1995;29:111-117). The aim of this study is to use the confocal laser scanning microscopy (CLSM) to study the bonding interface between affected dentine and resin-modified glass-ionomer. Carious dentine was removed chemomechanically from carious lesions by means of NMAB and NMAB-Urea. Teeth in which complete caries removal was deemed to have been achieved by normal criteria were restored with resin-modified glass-ionomer (Vitremer). Fluorescent dye (Rhodamine B) was incorporated into the primer and applied onto the cavities according to manufacturer's instruction prior to restoration. A control cavity of the same depth as the carious lesion was prepared using the rotary instrument on the opposite side of the solution-treated cavity. All the control cavities were restored with composite (Z100). Black sections and thin sections (100-120µm) were prepared from the specimen teeth and examined under scanning electron microscope (SEM) and confocal laser scanning microscope (CLSM). The superficial layer of dentine remaining on the cavity floors appeared to have a very uneven with many undurmed areas. The primer of the resin-modified glass-ionomer penetrated non-uniformly into dentinal tubules of the affected dentine while the pattern of penetration was much more uniform in control cavities. The results indicated that the bonding interface between resin-modified glass-ionomer and affected dentine was different from that of sound dentine.

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Biological evaluation on glass ionomer cement using tissue culture. J. A. GUNAWAN* (Faculty of Dentistry, Trisakti University, Jakarta, Indonesia).

The use of materials endodontic treatment must consider the biological effects of materials on the dental pulp. Even though it has been recommended as a filling lining material, using it as a sealer is not popularly known. That is why this research has been conducted to find out the difference between the biocompatibility effect of glass ionomer materials and the calcium hydroxide material by tissue culture method using BHK 21 (C-13) cell lines. Twenty-eight specimens of glass ionomer material and calcium hydroxide materials were divided into 2 groups and control group. These specimens were put into 24 wells culture tube and BHK 21 (C-13) cells were added into each well. These cells were harvested after 24 hours and the toxic effects were observed by counting the dead cells compared with the living cells. The t-test analysis showed that there was no significant difference ($p > 0.05$) between the biocompatibility value of glass ionomer material group ($92,7410 \pm 4,5596$) and calcium hydroxide material group ($94,3090 \pm 2,9475$). It can be concluded that the biologic effect of the glass ionomer cement was similar to that obtained in the calcium hydroxide cement by tissue culture. This finding suggests that the tested glass ionomer cement can be used to replace calcium hydroxide cement as a sealer for obturated roots.

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Biotypes of Oral *Candida albicans* Isolates in a Tanzanian Child Population L.P. SAMARANAYAKE¹, M.I. MATEE², F. SCHEUT³, E. SIMON² & E.F. LYAMUYA² (University of Hong Kong and Faculty of Health Sciences, Muhimbili, Tanzania¹ and Aarhus, Denmark²).

Although biotypes of *Candida albicans* from adult populations, especially in the West, have been described, there are no data either from a child population, or from the African continent. Hence a total of 200 oral *C. albicans* isolates from Tanzanian children aged 6-24 months, were biotyped using two commercially available API micromethod kit systems and a boric-acid resistance test (Williamson, Samaranayake & MacFarlane, *Microbios* 51:159-167, 1987). The predominant biotypes, which comprised two thirds of the organisms isolated were, J1S (19.5 %), A1S (16.0 %), J1R (14.5 %), A1R (9.5 %) and P1R (7.5 %). In total 16 new biotypes comprising 44 (22 %) isolates, which have not been described hitherto were found in this Tanzanian population, and of these, P1R biotype predominated with 15 (7.5 %) isolates. There was no significant association between predominant biotypes (with clusters > 15 isolates) and the age, gender, breast feeding, and malnutrition. These data together with our previous studies in healthy adults from China (Xu & Samaranayake, *Arch Oral Biol* 40: 577-579, 1995), and HIV-infected individuals from Hong Kong, UK, Germany and Australia (Tsang et al. *J Oral Pathol Med* 24: 32-36, 1995) indicate i) biotype profile of *C. albicans* isolates may differ in paediatric and adult populations, and ii) global distribution of various sub-types of this common opportunistic pathogen.

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The Prevalence, Distribution and Identification of Oral *Candida* in Smoker. K. ITHARATANA*, P. PIPATANAGOVIT and V. ANEKJUK. Dept. Oral Med. Chula. Univ. Bangkok, THAILAND.

The aims of this study were to determine the prevalence, distribution and identification of oral *Candida* in 47 non-smokers and 64 smokers by using imprint culture for the isolation. The identification of *Candida* was carried out according to Mc. Glis and Beneke and also the modified criteria of Kreger-van Rij for final identification. The prevalence of *Candida* in smoker (85 percent) was significantly higher than in non-smoker (48.44 percent) ($p < 0.001$). The mucosal site from which *Candida* was most often isolated was the posterior dorsal tongue and the floor of mouth was the least one in both groups. *C. albicans*, *C. parapsilosis* and *C. tropicalis* were mostly identified in each groups. The highest isolation in non-smoker was *C. albicans* (69.56 %) whereas in smoker, *C. parapsilosis* was found mostly (60.78 %). In smoker, more *Candida* species were identified than in non-smoker. It can be concluded that tobacco-smoking influences the oral *Candida* carrier rate. More *Candida* species were found in smoker. This study was supported by Tantaraks Research Foundation, Thailand.

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Effect of Mouthwash on Bacteremia Cases of *S. viridans* Post Extraction.
DJAIS. A.* (Dental Faculty University of Indonesia, Jakarta, Indonesia)

Bacterial endocarditis caused by *S. viridans* bacteremia post extraction has been reported. The effect of 0.1% Hexetidine mouthwash on *S. viridans* bacteremia post 3rd molar malposition extraction was examined in this study. Subjects' criteria were: 20 - 25 yrs; OHI-S < 2; gingivitis (-); periodontitis (-); not under antibiotic treatment; 3rd molar carries free and vital. Twenty six adults were divided randomly into 2 groups of 13 each. The control group rinsed with saline solution for 30 seconds. The experimental group rinsed with 0.1% Hexetidine for 30 seconds. Third molar extractions were done in sterile condition and required no longer than 3 minutes. To identify *S. viridans*, samples were taken from plaque and blood. Plaque was taken by scalers and pooled in two starter broth media, each incubated in aerobic and anaerobic conditions. Blood was drawn 5 minutes before extraction this was followed with blood drawn 5 minutes and 10 minutes post extraction. One cc of blood from each draw was pooled in BHI broth and incubated aerobically. Five cc of blood from each draw was pooled in 'Roche' blood culture and incubated anaerobically. The results showed that *S. viridans* bacteremia 5' post extraction from control group was 11/13 cases and experimental group was 5/13 cases. *S. viridans* bacteremia 10' post extraction from control group was 8/13 cases and experimental group was 3/13 cases. This results statistically were significant different ($p < 0.05$). The conclusion 0.1% Hexetidine was significant to reduce *S. viridans* bacteremia in selected population.

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Functional Rehabilitation by Metal Reconstruction of Post Operative Mandibles
H. SOEPRAPTO* (Prosthodontic Dept., Airlangga University, Indonesia)

One of the choices in the treatment of mandibular bone Ameloblastoma is mandibular resection. In such a case, rehabilitation/reconstruction is expected to restore the mandible functions, which include kinesiology, masticatory, phonetics and aesthetics. One alternative device to be used for mandibular rehabilitation/reconstruction is individual metal framework made of Cobalt Chromium casting. The present research is based on 16 clinical cases consisting of 8 cases of hemimandibulectomy and 4 cases of partial mandibulectomy, all of which were rehabilitated by means of individual metal framework made by the researcher, and 4 cases of hemimandibulectomy using factory made metal framework as a control group. After the rehabilitation, we gave a regular training program and conducted clinical testing on the mandibular functions using 14 variables. From the 14 variables tested, there was one which showed a statistically significant difference. This particular variable is Chewable foods. All the other variables proved to be homogenous. The rehabilitation/reconstruction of the mandible using individual metal framework made of Cobalt Chromium may restore the mandibular functions at least as well as does the factory made framework. In fact, by using individual metal framework made of Cobalt Chromium casting subjects can chew the foods better.

71 Predictors of Need for Orthodontic Treatment in Schoolchildren in Surabaya, Indonesia. T. AGUSNI¹, D. SINDHUSAKE* and P.D. BARNARD (Public Health, Dentistry, University of Sydney, Australia)

From surveys of schoolchildren in Surabaya, Indonesia it appears that the need for orthodontic treatment is considered high. The purpose of the present study was to determine predictors of need for orthodontic treatment in 686 12 year old schoolchildren in Surabaya, Indonesia. The data were collected from self-administered questionnaires and interview and the need for orthodontic treatment was identified by using the Dental Health Component (DHC) and the Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN). Univariate and multiple logistic regression analyses were performed to determine predictors of the needs for orthodontic treatment (IOTN). The predictors tested included: gender of the schoolchildren; education of parents; occupation of parents; locality; dental attendance; regular dental visit; and satisfaction of children with their appearance. Locality, satisfaction with appearance, and regular dental visits appeared to be significant predictors. Adjusted odds ratio of need for orthodontic treatment in rural schoolchildren is 1.7 times compared to their urban counterparts. Schoolchildren who are satisfied with their appearance require treatment only 0.4 times of those who are dissatisfied with their appearance. Those with regular dental visits require treatment 0.7 times of the non-regular visitors.

72 Profile Preference between Dentist and Patient Groups N. SRISUK, K. SUKARAT, V. JUVATANASUMRAM, S. KASEMSIRI AND S. KAVAYANON (Khon Kaen University Thailand)

The objective of the study is to investigate a profile preference between to group of people: patient and dentist groups. The total number of people is 330. The patient group consists of two subgroup based on the age: 12 to 18 years and 19 years old. The sample groups were asked to choose the 7 silhouette facial profiles that were set up by Foster's method. The profiles were modified the lip area for 2 mm stage a series of profile from retusive to protrusive condition. Each judge was asked to choose the most to least pleasing profiles of male and female by rating scores.

The results of the study were statistically analyzed by the analysis of variance. There was significantly different ($p < 0.05$) between the patient and dentist groups. Whereas there was no significantly different ($p < 0.05$) between the younger and adult patient groups. However, in the most pleasing profiles of male and female for each group show that the lip positions were closing to the ideal S-line or 2 mm back of the E-line. Whereas the male lip positions for the most pleasing profile in adult patient group were -8 mm back of the E-line. Hence we conclude that dentist and the younger age patient groups preferred a fuller male face than the adult patient groups. Therefore, the future dentist groups might accept a straighter adult male face and perhaps establish a straighter value for adult male profile.

73 Quantitative Changes of Rat Alveolar Bone Cells to Orthodontic Force. K. POOLSIEN¹, W. MATHURASAI², W. APINHASMIT² and S. VITEPORN² (Department of Orthodontics, Faculty of Dentistry, Chiangmai University¹, Chulalongkorn University², Thailand).

The objective of this study was to investigate the effect of orthodontic force on the amount of osteoclasts and osteoblasts in the pressure and tension sides of alveolar bone at different periods of time. The sample consisted of 16 male wistar rats, aged 60 days. The left maxillary first molar of each animal was retracted by 40 grams force from plastic module while the right one was not retracted and used as a control. Two animals were sacrificed randomly after each of the following periods: 1, 2, 4, 6, 8, 10, 12 and 14 days, respectively. The osteoclasts and osteoblasts of the alveolar bone were quantitated from the serial sections of the alveolar bone distal to mesiobuccal root of the first molar cut in mesiodistal direction. The result showed that the average numbers of both cells of the experimental group at each period were significantly higher than those of the control groups ($p < 0.05$) as tested by Student's t test. They reached a peak after 6 days of retraction ($p < 0.05$) as tested by Oneway ANOVA and multiple comparison, and gradually declined. It was concluded that the maximum response of alveolar bone to orthodontic force as studied by the number of bone cells occurred after 6 days of treatment.

74 Comparison of Tongue Functions During Swallowing Between Females and Males C.-L. PENG*, C.-T. LIN, P.-C. JOST-BRINKMANN, R.-R. MIETHKE (Taipei Medical College, Taipei, Taiwan and Humboldt University Berlin, Berlin, Germany)

The previous ultrasound studies on tongue functions had potential artifacts caused by movement of the submental area during function. Consequently, tongue movements were misinterpreted. A new dynamic tongue imaging technique, the cushion-scanning technique (CST), was designed to overcome this problems. The purpose of this study was to apply this new technique to observe and compare tongue functions during swallowing between females and males. A computer aided B+M mode ultrasonography was used in combination with the CST to measure duration and range of tongue movements of 30 females and 25 males during swallowing. Females were found to have a longer duration of swallowing ($p < 0.05$) and wider range of tongue motion ($p < 0.05$) than males. Based on the results, we may conclude that the tongue function is sexual determined as far as duration and range of tongue movements are concerned. The computer aided B+M mode ultrasonography in combination with the CST is a valuable tool for the evaluation of tongue functions.

75 Alveolar Ridge Preservation vs. Ridge Augmentation - A Case Report. M.M.Y. FONG* and A.B.M. RABIE (Department of Children's Dentistry and Orthodontics, The University of Hong Kong)

Availability of a broad well rounded alveolar ridge is essential for the success of orthodontic tooth movement. Accidental bone loss during extraction for orthodontic purposes impedes the progress of such a treatment. This presentation stresses the importance of preserving the integrity of the alveolar ridge through alternative choice of extractions. When preservation of the alveolar ridge is not possible, successful ridge augmentation with a compatible graft material is imperative. Recently, we reported that demineralized bone matrix (DBM) augmented the integration of autogenous bone grafts and showed that the composite bone graft is superior to the autogenous bone graft alone. The following also illustrates the clinical applications of composite bone graft in ridge augmentation for orthodontic purposes.

The first case demonstrates extraction of lower second premolars instead of buccally placed first premolars to avoid the loss of the buccal plate of bone during extraction. The second, shows the treatment of a bony defect created by an extraction of a buccally placed premolar. Intramembranous bone was harvested from the chin, fixated at the graft site with Branemark screws and packed with DBM. Serial radiographs demonstrated regeneration of bone at the grafted site and revealed a superior integration of the IM graft to the host bed. Teeth were moved orthodontically into the grafted area 3 months post operatively.

In conclusion, attention must be given to preserving a healthy alveolar ridge during treatment planning. In the event of bone loss, IM-DBM is an effective graft material for ridge augmentation and merit further clinical investigation.

This study was supported by RCG Grant # 335/251/0023, University of Hong Kong

76 The Analysis of Oral Lesions from 5,060 Biopsies of Thais. V. VIPISMAKUL*, P. SINGHAWANAKUL and S. POOCHOUM (Department of Oral Pathology, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, Thailand)

The retrospective study was aimed to provide information on the frequency, incidence and types of the most common oral lesions from 5,060 consecutive biopsies (1985-1994) of Department of Oral Pathology, Faculty of Dentistry, Chulalongkorn University, Thailand. The data were collected and evaluated by mean of the computer program fox pro 2.5. The findings revealed that ten common lesions were cysts (43.28%), pyogenic granuloma (5.18%), ameloblastoma (5.06%), fibroma (3.78%), squamous cell carcinoma (2.96%), mucocoele (2.94%), papilloma (1.80%), lichen planus (1.54%), fibrous dysplasia (1.21%) and ossifying fibroma (0.95%), respectively.

77 Comparative Effect between Two Ultrasonic Scaler Tips to Root Surfaces. S. TAMSAILOM*, C. TECHAPRASERTVITAYA and W. APINHASMIT (Department of Periodontology, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, Thailand).

To compare the effect on the root surfaces, the ultrasonic scalers with probe-type tip and curved tip were used to remove the subgingival calculus of 10 single-rooted teeth with periodontal disease which had been planned for extraction. The mesial and distal surfaces of each selected tooth had the same calculus index and probing pocket depth. They were assigned using systematic randomization to be instrumented by the different types of the ultrasonic scaler tips until the root surface felt smooth and clean as examined with explorer tip. After extraction, the teeth were prepared and investigated under a scanning electron microscope. The roughness and loss of tooth substance scores were determined by the method of Lie and Lekness (*J Periodontol* 56:522-531, 1985). The result indicated that the medians of the scores of the group using probe-type tip and curved tip were 2 and 3, respectively. The former was less than the latter significantly ($p < 0.05$). It was concluded that both types of ultrasonic scaler tips caused the root surface roughness and loss of tooth substance, but the probe-type tip caused less damage.

78 Use of Minocycline Local Delivery as Adjunctive Therapy in Periodontitis. O. CHARATKULANGKUN* and N. LAOSRISIN (Department of Periodontology, Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand)

This study was designed to evaluate the periodontal changes by the local delivery of minocycline as adjunct to conventional periodontal therapy. The clinical response in sites with different severities based on initial probing pocket depth were investigated after the treatment of minocycline (Periocline) following scaling and root planing compared with the treatment of scaling and root planing or minocycline only. Fifteen periodontitis patients were selected to participate in this study who had no systemic diseases and had not received any antimicrobial drug and periodontal therapy within 6 months. Each subject was randomly assigned to 4 test groups in 4 quadrants: scaling and root planing with minocycline (S+M), scaling and root planing only (S), minocycline only (M) and no treatment (N). All patients received supragingival scaling and oral hygiene instruction at baseline. Scaling and root planing were performed at baseline whereas minocycline were applied at baseline, 1, 2 and 3 weeks after baseline. Clinical responses were determined by gingival index, probing pocket depth and clinical attachment level at baseline and 4 and 8 weeks after treatment by using the electronic probe. The results showed significantly clinical improvement by gingival index in every groups after treatment; however, the S+M group seemed to be most decreased. There was no difference in attachment gain between S+M and S group in moderately periodontal destructive sites, but there was in severely periodontal destructive sites ($P < 0.05$). These findings suggested that the use of minocycline local delivery as adjunctive therapy in periodontitis could improve clinically periodontal status greater than scaling and root planing or the medication only and seemed to be appropriate for the severely periodontal destructive lesions (probing pocket depth ≥ 6.0 mm.)

- 79** Distribution of Severe Periodontitis Destructive Condition in Urban and Rural Thailand. Y. SONGPASAN*, N. HONGPRASONG, V. BUATONGSRI, P. PHANTUMVANIT. (Mahidol Univ, Thammasat & Chulalongkorn Univ., Bangkok, Thailand).

The purpose of this report was to compare the periodontal status of rural and urban Thai population. The cross-sectional study for severe periodontal destructive condition was carried out in 35-55 years old Thai population, both males and females. All first and second molars and central incisors (12 teeth) of the total of 1,167 rural farmers from 4 villages in Payao province and 654 urban bank employee from Bangkok were examined using CPITN. The percentage of persons having at least one tooth with severe periodontal destructive condition, CPITN scored 4, was higher in rural (27.9%) than in urban (17.0%). Significant differences of the mean number of teeth in various CPITN scores were found among the 12 teeth examined, i.e. CPITN 4: rural = 4.3 ± 1.92 v.s. urban = 3.3 ± 1.86 ($p < 0.001$) and CPITN 3: rural = 5.4 ± 2.09 v.s. urban = 4.7 ± 2.13 ($p < 0.001$). The most common scored CPITN 4-teeth were the right second molars, i.e. #17 (54.1%) and #47 (52.0%) whereas the lower incisors, i.e. #31 (3.1%) and #41 (8.9%) were the least affected. The study showed that severe periodontitis destructive condition was higher in rural population than in urban population. This seems to be similar to the destructive periodontal condition between in the developing countries and the industrialised countries which has been reported. Supported by Chulalongkorn University Rajadapisek Sompaj Research Fund.

- 80** Relation between Severe Periodontitis and Smoking Habits. P. PHANTUMVANIT*, N. HONGPRASONG, V. BUATONGSRI, Y. SONGPASAN & N. CLARKE. (Thammasat & Chulalongkorn Univ, Mahidol Univ, Bangkok, Thailand; Univ of Adelaide, Adelaide, Australia).

The purpose of this study was to examine the relationship between smoking and the occurrence of severe periodontal breakdown in rural and urban Thai population. The retrospective epidemiological study was carried in 200 rural (Payao) and 111 urban (Bangkok) severe periodontitis (CPITN=4) subjects, both males and females. A set of questionnaires relating to smoking habits and number of cigarette smoking per day was completed by subjects. The findings showed that there were more smokers in rural (50.8%) than urban (30.4%) subjects ($p < 0.001$). But most of the urban subjects smoked 10-20 cigarette/day (75.0%) whereas most of the rural subjects smoked less than 10 cigarette/day (84.9%). There was no significance difference between the percentage of CPITN 4-person in smoking and non-smoking subjects in both the urban (27.8 v.s. 28.5) and rural (34.8 v.s. 36.5) groups. However, the prevalence of severe periodontitis was significantly different between urban and rural subjects ($p < 0.001$). The data indicates that severe periodontitis may not relate only to smoking habits but other risk factors that should be considered concurrently. Supported by Chulalongkorn University Rajadapisek Sompaj Research Fund.

- 81** Oral microbiological and physiopathological status of post irradiated nasopharyngeal carcinoma patients. W.K. LEUNG*, L.J. JIN, L.P. SAMANARAYAKE & G.K.C. CHIU (Periodontology & Public Health and Oral Biology Unit, The University of Hong Kong)

Objective. To investigate the oral microbiological and physiopathological status of post-irradiated nasopharyngeal carcinoma (NPC) patients. **Study design.** 33 NPC patients (mean age 53 ± 10 yr) who completed head and neck irradiation therapy (3.3 ± 3.0 yr post-operation) were screened for oral mucosal lesions. 52% of the subjects had not received post-irradiation dental care. Stimulated whole saliva (SWS) flow rate, pH, buffer capacity, carriage rate of cariogenic micro-organisms, enterobacteria and yeasts were assessed. **Results.** All subjects had xerostomia (SWS flow rate: 0.04 ± 0.04 ml/min) and 58% had candidiasis. Both SWS pH (6.4 ± 0.6) and buffering capacity were low while *Streptococcus mutans* and *Lactobacillus* spp. carriage were extremely high ($1.4 \times 10^7 \pm 2.0 \times 10^7$ and $2.4 \times 10^5 \pm 5.7 \times 10^5$, respectively). 70% of the subjects were found to be harbouring at least one species of enterobacteria including *Acinetobacter* spp., 15%; *Chryseomonas luteola*, 12%; *Citrobacter freundii*, 6%; *Enterobacter cloacae*, 18%; *Escherichia coli*, 3%; *Flavimonas oryzae*, 3%; and *Pseudomonas aeruginosa*, 12%. All subjects were carrying at least one species of yeast, namely *Candida albicans*, 73%; *C. tropicalis*, 27%; *C. famata*, 3%; and *C. parapsilosis*, 3%. **Conclusion.** The Hong Kong NPC patients constituted a high risk group for dental caries and oral fungal infection. The risk of developing such disease appears to be very high perhaps in part due to insufficient post-irradiation dental care. This project was supported by CRCO of Hong Kong.

- 82** Comparative Study of Diabetic and Non-diabetic Saliva. E. Benjavongkulchai*, C. Sreuwong and S. Ruksasin (Chulalongkorn Univ., BKK, Thailand).

Glucose and other components of saliva from diabetic and non-diabetic patients have been previously determined and compared. Yet, no conclusive results have been made. In this work, we analysed pH, flow rate, glucose and total protein concentrations in diabetic and non-diabetic saliva and also studied the corresponding amylase activity and protein pattern under SDS-PAGE. The stimulated whole saliva samples were collected from twenty non-diabetics and forty non-insulin dependent diabetics between 7.00-8.00 am. The results indicated no significant difference between the two types of saliva except for that glucose concentration of diabetics was significantly higher than non-diabetics. This work was supported by Dental Research Fund, Fac. of Dentistry, Chulalongkorn Univ.

- 83** Histologic Finding of Embryonic Tooth Germ Caused by Fluoride in NaF. L.S. RADIOSUNU (Dept. of Pedodontics, Faculty of Dentistry, Gadjah Mada University, Yogyakarta, INDONESIA)

The aim of this study was to examine the role of fluoride in NaF to the growth and development of embryonic rat's tooth germ. Pregnant Albino Wistar rats at age 3 months divided in to 2 groups: CONTROL group (administered by isotonic solution); NaF group (administered by 0.02 mg/ml NaF in 0.02 ml distilled water). Intraperitoneal injection was given by 1 cc, once in 2 days. On day 15 and 18, pregnant rats were killed and their embryonic tooth germ were subjected to LIGHT MICROSCOPIC. The fluoride content was analyzed by SPADN'S REACTION spectrophotometric method, using a UV-VIS spectrophotometer instrument. Histologic finding analyzed by LIGHT MICROSCOPE. The result of the study were as follows: fluoride content in embryonic tooth germ on day 15 and 18 control group < NaF group ($p < 0.01$). This difference was significant ($p < 0.01$) as tested by ANOVA. The result of histologic finding of embryonic tooth germ on day 15, was at the time on BELL STAGE, it is the time of enamel organ proliferation in oral epithelium. On day 18, the morphologic of tooth germ on bell stage has advanced and was at the time of COMPLETE BELL STAGE. It is concluded that no differences in histologic finding on control and NaF groups of embryonic tooth germ on day 15 and 18, although there was significant difference on fluoride content. This study was supported by Gadjah Mada University, Ministry of Education and Culture, Indonesia Government.

- 84** An increment of acid resistance on pit and fissure in human dental enamel by laser irradiation. A. BAHAR. (Dept. of Preventive and Public Health Dentistry, Faculty of Dentistry, University of Indonesia, Jakarta, Indonesia).

The acid resistance of pit and fissure enamel in human dental enamel by using normal pulsed Nd-YAG laser was examined. Moreover, the pit and fissure of dental enamel were topically applied with a solution of acidulated phosphate fluoride (APF) after laser irradiation. The acid resistance of the pit and fissure enamel was evaluated by the amount of dissolved calcium per square millimeter of the surface area. The amount of dissolved calcium in acid solution was determined with an atomic absorption spectrophotometer. The areas of pit and fissure exposed to the laser and acid solution were calculated by a three dimensional computed image analyzer. The laser irradiation caused about 40% acid resistance to the pit and fissure enamel. The combination of laser irradiation and APF application revealed greater acid resistance to the pit and fissure than laser irradiation alone.

- 85** De/ remineralization from different commercial dentifrices: a pH-cycling study. A. ITTHAGARUN*, S.H.Y. WEI, and J.S. WEFEL¹. (Department of Children's Dentistry and Orthodontics, The University of Hong Kong, Hong Kong; ¹Dows Institute for Dental Research, The University of Iowa, USA).

In our previous study, F uptake of dentifrices manufactured locally in some developing countries have been evaluated and compared (JDR, 1996; 75:194). The objective of this study was to compare the de/ remineralization effects of those dentifrices such as Maxam Tartar Control[®], Advanced Formula Crest[®], Colgate MFP[®] and one non-fluoride dentifrice as control, by using a single section technique (Wefel et al., JDR, 1987; 66: 1485-1489) with the pH cycling model (Heilman et al., JDR, 1991; 70:493). Sound molars were painted, leaving the 1 mm wide 'window' on the buccal and/or lingual side, placed in the demineralization solution for 96 h to produce artificial caries, 100-120 μ m deep. The teeth were then longitudinally sectioned, 100 μ m thick, and randomly divided into 4 groups (4 sections/group). The pH cycling model was utilized for 10 days. Polarized light microscopy and microradiography were used to evaluate the lesion depth, lesion area and mineral content of the lesion before and after treatment. The control group showed an increase in lesion depth of 51%, and was statistically different from all test groups which ranged from -7% to 18% ($p < 0.05$ to $p < 0.01$, ANOVA and t-test). No statistical difference was observed among the fluoride containing groups. The *in vitro* single section technique used with pH cycling in this study was able to successfully show lesion progression and mineral changes in the initial lesions. (Supported in part by CRC Grant: 345/251/0058, The University of Hong Kong)

- 86** Antimicrobial Effect of Sereh to *Candida albicans*' Growth on Denture. E. WAHYUNINGTYAS (Gadjah Mada University, Yogyakarta, Indonesia).

This research determined the antimicrobial effect of Sereh to *Candida albicans*' growth and the transverse strength of denture. Denture smear from inflamed mucous was cultivated on Sabaroud's medium. Diffusion and well's methods were used for sensitivity test. Sixty samples were divided into 4 groups concentration. The radial zone on each well was observed by sliding caliper. The sixty specimens of transverse strength were divided into 3 groups concentration (5%, 10% and 15%). Each group was divided into 2 soaking duration (10 minutes and 10 hours). The transverse strength test was done by Universal Testing Machine. There was significant difference among *Candida albicans*' growth in different concentrations ($p < 0.001$). There was significant difference in transverse strength between concentrations and soaking duration ($p < 0.001$) as tested by ANOVA. Sereh had antimicrobial effect to *Candida albicans*' growth and it affected the transverse strength of acrylic resin in clinical tolerance.

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Effective Concentration of Papain Solution to Remove *Candida albicans*. S. SUNARINTYAS¹*, R. HARTONO² and H. SOENARTYO² (¹Gadjah Mada Univ., Yogyakarta and ²Airlangga Univ., Surabaya, Indonesia).

This study was aimed to determine the effective concentration of papain solution as a denture cleanser in reducing *Candida albicans* from acrylic surfaces. The study was conducted on 20 polished and 20 unpolished acrylic plates (10 x 10 x 1 mm). The plates were inoculated with yeasts and soaked in papain solution of 1.5, 1.0, and 0.5 mg/ml and buffer solution for 8 hours. The yeast colonies were determined by counting the amount of colonies which grew on Sabouraud's agar after inoculated with 0.1 mg/ml suspension of 10 ml Sabouraud's broth containing vortexed yeasts adhered to the plate. The result in CFU/ml (Mean \pm SD) were as follows:

Concentration	Polished	Unpolished
1.5 mg/ml	3.2 \pm 0.9	7.6 \pm 0.2
1.0 mg/ml	3.2 \pm 0.4	7.2 \pm 0.5
0.5 mg/ml	71.0 \pm 1.7	100.2 \pm 1.9
Buffer	376.4 \pm 4.3	638.4 \pm 7.4

ANOVA and LSD-test at the 0.05 level were done. In conclusion, 1.0 mg/ml concentration of papain solution was the most effective concentration in reducing *Candida albicans* from acrylic resin surfaces (both polished and unpolished surfaces).

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Dental Treatment Needs in an Elderly Population
LINA NATAMIHARJA* (Faculty of Dentistry, University of North Sumatera, Medan, INDONESIA)

The purpose of this study was to describe the oral health condition and to analyze the oral need of 60 years of age and older. The sample of 200 respondents living in their homes and 89 institutionalized were examined in Medan. Ninety eight percent of the subject had 1 - 28 tooth loss and only 17% used dentures. The prevalence of edentulousness was 22.50% and only 6.93% used full dentures. All dentate subject required some treatment. The average of remaining teeth was 11.19, DT 0.58, FT 0.01, DFT 0.001 and MIT 2.42. Overall, 3.46% required oral hygiene instruction, 26.72% scaling and oral hygiene instruction, 22.15% simple periodontal surgery, and 3.12% complex periodontal surgery. Univariate and bivariate analysis was done, and the results showed a significant relationship between the average of remaining teeth, dental visits and reading ability but not with sex. This study supports the fact that the elderly have a variety of treatment needs that have not been met, specifically for periodontal treatment and denture work.

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THE SPECIFIC TYPE OF DENTAL DECAY IN CLOVE CIGARETTES SMOKERS
Farida Soetarto* (National Inst. of Health Research & Dev. R.C. for Non Communicable Diseases, Jakarta, Indonesia).

Previous studies have shown that specific type of dental decay is a result of habitual smoking of clove cigarettes. (Clove cigarettes contain cloves which are not found in ordinary cigarettes). This information should be made known to health workers and the general public, and should accompany anti smoking campaigns & dental health care. A retrospective cohort study of 1160 bus drivers in Jakarta who smoked clove cigarettes and non smoker showed that specific decay occurs in form of form, location and pathophysiology at an incidence of 55.8%. For smokers < 15 years, smoking from 7 - 12 clove cigarettes per day the predicted risk of decay is 83%, for smokers > 15 years, smoking > 18 clove cigarettes per day, the predicted risk of decay is 95%. Decay generally starts at the cervical of tooth. For mandible teeth, decay occurs on the labial/buccal surfaces. For maxillary teeth the labial/buccal surfaces are affected except for the first molar. The palatal surface is affected except for the front teeth.

It can be concluded that the specific type of decay is affected by the number of years of smoking and the number of cigarettes smoked each day, and locality of decay on a tooth's surface is generally far from the orifice of the Salivary Gland.

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Dental Health Service Utilization in Rural Area of Serpong, West Java.
A. RAHARDJO, A. BAHAR, I. AMALLIAH. (Dept. of Preventive and Public Health Dentistry, Faculty of Dentistry, University of Indonesia, Jakarta, Indonesia).

The association of utilization of dental health services with the level of education, family size, perception on obstacles to utilize health services, occupation, family income, perceived distance to the nearest health centre, and need for dental health services were examined. Type of the study was a cross sectional and retrospective study in house-holds as a house-hold dental health survey. The population study was house-holder in rural areas of Serpong, West Java. EPI/WHO sampling method was used in this study. The instrumentation of this study was interview and intra oral examination. Data was analyzed with univariate, bivariate and multivariate analysis. Level of education, perception on formal dental health service utilization, occupation, per capita monthly income, perceived distance, duration of illness/ disability days and numbers of decayed teeth have a significant correlation to formal dental health service utilization, except for factor of family size.

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A comparative study on health of students between Jakarta and Hokkaido
R.R.DARWITA (Dept. of Preventive and Public Health Dentistry, Faculty of Dentistry, University of Indonesia, Jakarta, Indonesia).

The incidence of disability were compared between Hokkaido in Japan and Jakarta in Indonesia. Subject of this study were consist of 6 to 14 years old of age. The results was indicated that high nutrition (2.1%), visual defect (20.3%), conjunctivitis (3.2%), dental caries disease (93.1%) and oral disease (16.3%) were higher in the student of Hokkaido than Jakarta's student. On the contrary, the incidence rate of low nutrition (1.2%) and infectious skin disease (0.9%) were found higher in the student of Jakarta than Hokkaido. The differences are indicated that the student in both area are particularly vulnerable by the health problems. These are could be have association with the condition of climate, GNP of country, hygiene and education level, which support the student behavior. Therefore, to support the student behavior on preparing the nutrition and infectious disease in Jakarta with have to look at several industrial countries such as Japan, and to prepare the facility on hygiene, education and other environmental factors which relation to preparing the health condition of students.

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Effect of acidic water containing tin in Bangka Island, Indonesia, on enamel's solubility. S.S.WIMANTO* (Faculty of Dentistry, Trisakti University, Jakarta, Indonesia)

Bangka is one of the Indonesian island in the tin belt. The high prevalence dental decay on Bangka Island peoples, may cause by tin content and acid condition of water on this island. The effect of acidic water containing tin on enamel's solubility was assessed in a laboratory experiment. The enamel powder were soaked in a solution containing of tin in the various concentration (from 0.00 ppm, 0.02 ppm, 0.04 ppm, 1.20 ppm and different pH (from 7.0, 5.5, 5.0, and 4.5). The tin's concentration and the pH were from laboratory test of drinking and cooking water for one year observations. Solubility of enamel was observed by Ca and P ions released in the solution. Ca ions were measured by using atomic absorbent spectrophotometer and P ions by using visible light spectrophotometer. It were found that enamel's solubility in the 1.20 ppm pH 4.5 tin solution (Ca ion : 2998.28 \pm 69.81, P ion : 686.42 \pm 4.62) was the highest and in the 0.00 ppm pH 7.0 tin solution (Ca ion : 33.79 \pm 2.96, P ion : 14.12 \pm 0.29) was the lowest. It is also was found that was interaction between tin concentration and pH of the solution on enamel's solubility. The differences and interaction were significant ($p < 0.001$) as test by ANOVA. Hence it was concluded that increasing of tin concentration and acid condition of the water and interaction between of both will be increased solubility of enamel.

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Effects of stabilization appliance therapy on nocturnal parafunctional behaviour. A. YAP* (National University of Singapore, Singapore)

This study was designed to investigate the short term effects of stabilization appliances on parafunctional oral motor behaviour during sleep in patients with and without signs of temporomandibular disorders (TMD). Twenty-one patients with nocturnal parafunctional behaviour were selected for the study based on specific criteria. Of the 21 patients, 14 had various signs and symptoms of TMD. Full-arch maxillary stabilization appliances with flat occlusal surfaces and canine guide ramps were made for patients to wear to sleep. Baseline examinations were done prior to appliance issue and patients were reexamined at 1 week and monthly intervals up to 3 months after issue by one evaluator. During each visit, the presence, extent and location of wear facets on the guide ramps caused by bruxing and occlusal facets due to clenching were noted. For patients with TMD, objective signs were also recorded. Appliances were gently polished with fine silicone abrasives to remove shiny areas of active facets and readjusted to ensure even bilateral posterior occlusal contacts in centric relation at the end of each visit. No medication was taken and no alterations to the occlusion were made during the course of this study. Results were analyzed using non-parametric statistical analysis (Mann-Whitney U Wilcoxon Rank Sum W Test) at significance level 0.05. For both patient groups, occlusal facets were present at every visit. Not all patients were active bruxers but those who were, had wear facets on bilateral guide ramps consistently. The extension of these facets indicate that the mandible moves laterally far beyond the edge-to-edge contact relationship of the canines during eccentric bruxism. Results show that stabilization appliances do not stop nocturnal parafunctional behaviour in patients with and without TMD and indicate that, with the exception of TMD clicks, stabilization appliance therapy is effective in eliminating the signs of TMD evaluated.

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Clinical and MRI findings of patients with TMJ disc displacement.
W. CHOLITGUL(1)*, N. NISHIYAMA, T. SASAKI, Y. UCHIYAMA, H. FUCHINATA(2), M. NOHLIN(3)

(1)Chulalongkorn University,Thailand (2)Osaka University,Japan (3)Land University/Sweden

The aim was to describe the clinical findings and findings of magnetic resonance imaging (MRI) in patients with disc displacement of the temporomandibular joint (TMJ). Eighty-eight joints in 51 patients were examined. Clinical examination of each patient was performed prior to MRI. Two oral radiologists assessed the MRI images. Clicking was the most common clinical finding, found in 52 joints. Pain was reported for 25 joints. Anterior disc displacement with reduction was found in 39 joints, anterior disc displacement without reduction in 31 joints, compound dislocation (anterolateral or anteromedial) in 13 joints and sideways displacement in 5 joints. In about one fourth of the joints, MRI revealed abnormal configuration of the disc and the condyle. Joint effusion in either the upper or the lower joint compartment was found in 19 joints. Hence we conclude that MRI is a useful aid to assess the soft tissue and subtle osseous changes in patients with sign and symptoms of TMJ disorders. The most extensive soft and hard tissue changes were found in patients with anterior disc displacement without reduction.

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TEMPOROMANDIBULAR PAIN AND DYSFUNCTION SYNDROME DUE TO IMPACTED THIRD MOLAR, A REPORT OF TWO STUDIES.

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Temporomandibular Pain and Dysfunction Syndrome (TMPDS) may be associated with impacted third molars (ITM) since the symptoms of this syndrome occasionally subside following extraction of ITM. TMPDS is considered to arise from ITM as referred and/or psychogenic pain. Hence, two studies were conducted to evaluate the role of ITM as predisposing factor in TMPDS. In two studies (study I and study II), inclusion criteria were presence of ITM located in mandible and/or maxilla, unilaterally and/or bilaterally, with remaining teeth erupted in perfect function without traumatic history, organic TMJ disease, pericoronitis with ITM, oral soft tissue lesion(s). TMPDS was diagnosed with its cardinal signs and symptoms. In study I, of 41 randomly selected dental patients with TMPDS, there were 24 (59%) with ITM (62% above 20 years of age, 71% females) and 17 (41%) without ITM. Of a total of 65 ITM, 25 (38%) were mesioangular with 16 (64%) in mandible. There were 14 (58%) with joint/facial pain and 13 (54%) with clicking joints. Lateral pterygoid (92% cases) and masseter (88% cases) muscles were most commonly involved with tenderness. In study II, of 62 dental students with ITM, there were 20 (33%) with TMPDS (45% above 20 years of age, 55% females) and 41 (67%) without TMPDS. Of a total of 43 ITM, there were 24 (56%) mesioangular and 9 (45%) TMPDS with ITM in mandible located bilaterally. There were 13 (65%) with clicking joints and 10 (50%) with joint/facial pain. Lateral pterygoid (40% cases) and masseter (40% cases) muscles were most commonly involved with tenderness. It can be concluded that 33-59% persons with ITM, mostly above 20 years of age and females, may have TMPDS. Mandibular incoloangular ITM seems to be the main predisposing factor of TMPDS.

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